A STUDY OF THINKING STYLES OF COLLEGE STUDENTS IN RELATION TO SELECTED COGNITIVE AND NON-COGNITIVE FACTORS

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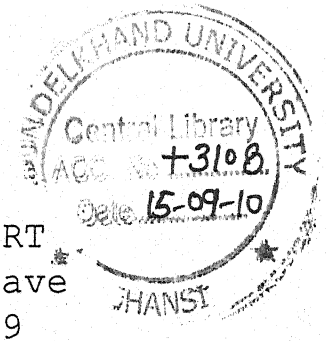

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This is to certify that ***Mr. Anup Singh,*** Research Scholar, Faculty of Education, Bundelkhand University, Jhansi worked under my guidance for the full period required, for the degree of Doctor of Philosophy in Education and that the thesis entitled "*A STUDY OF THINKING STYLES OF COLLEGE STUDENTS IN RELATION TO SELECTED COGNITIVE AND NON-COGNITIVE FACTORS*" is the genuine work of the candidate himself and fit for submission.

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DECLARATION

I, ***Anup Singh***, Research Scholar, Faculty of Education, Bundelkhand University, Jhansi declare that the thesis entitled "A STUDY OF THINKING STYLES OF COLLEGE STUDENTS IN RELATION TO SELECTED COGNITIVE AND NON-COGNITIVE FACTORS" is my genuine work and it has not been submitted previously.

Date: .....

(Anup Singh)

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Anup Singh

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CHAPTER – I

THEORETICAL ORIENTATION

CHAPTER - I

THEORETICAL ORIENTATION

1.1 INTRODUCTION :

The World Bank Report ***'Knowledge for Development (1999)'*** aptly remarks that the developing countries must strengthen the processes of acquiring knowledge, absorbing knowledge and communicating knowledge among their people in order to decrease the information gap between the developing societies and developed societies because in the present day world, knowledge is the most powerful means to development. This is so because in today's world, economies are built not merely through the accumulation of physical capital and human skills, but on foundation of information, learning and adaptation.

Further, the knowledge which is key to growth and development of developing countries depends largely on different types of thinking such as convergent / scientific thinking and divergent / creative thinking and their development. These in turn depend on thinking styles of the individual learners. Thinking styles are preferred ways of exploiting thinking abilities. This way, one may conclude that understanding, development and application of variety of thinking styles of individuals go a long way in all round development of the nation.

Moreover, many of the students we are consigning to the dust heaps of our classrooms, have the abilities to succeed. It is the teachers, not they (students) who are failing. Indeed teachers are failing to recognize the variety of thinking and learning styles they (Students) bring to the classrooms and reaching them in ways that don't fit them. Therefore, **Sternberg (1997)** very rightly suggested the educational implication stemming from the convergent-divergent thinking styles are far reaching. Convergent thinking styles are considered most condusive for sciences, maths and teaching and divergent thinking styles for arts.

Hudson (1966) has found that in general individual with convergent thinking styles prefer formal problems and tasks that are better structural and demand greater logical ability than the more open-ended problems forwarded by divergers. Convergers apparently that we need to take into account student's styles of thinking if we hope to reach them, especially in teaching. Thus situation warrants that investigations be carried out on thinking style of students.

1.1.1 MODELS OF THINKING STYLE

1.1.1.1 Guilford's Model of Thinking Styles

The term Convergent-divergent thinking was proposed in the early 1950's, when he introduced his word of intellect.

Guilford described the convergent thinker as one who can be distinguished by his ability in dealing with problems requiring one conventional correct answer clearly obtainable from the information provided.

The divergent thinker, however, is defined as one being highly adept in problems requiring the generation of several, equally acceptable answers where the emphasis is on quantity, variety and originality of responses. Whilst the convergent / divergent processes are not exclusive as certain convergent and divergent thinking arc more emotionally inhibited than divergers and appear to keep the different aspects of their lives compartmentalized'.

Getzels and Jackson (1962) found that teachers prefer learners who are having divergent thinking style than those who have convergent thinking style.

1.1.1.2 Das, Kirby and Jarman (1975) Model of Thinking Styles

This model states that information is integrated in the brain in two ways, through simultaneous and successive processing.

Simultaneous processing style can be characterized involving the synthesis of separate elements into groups that generally have spatial overtones, with all portions of the synthesis being surveyable or accessible without dependence on their position within the synthesis. This type of processing is required for instance, in the formation of any gestalt, or in the discovery of the relationships among two or more objects.

Successive processing style, on the other hand, involves the integration of separate elements into groups whose essential nature is temporal. Portion of this synthesis are accessible only in the temporal order of the series - each element leads to only one other and access to any element is dependent on the preceding elements. Successive processing is necessary for the information or production of any ordered series of events.

1.1.1.3 Kirton (1980) Model of Thinking Styles

Kirton identified two approaches to problem solving, namely - Adaptation arid Innovation. Both have been assumed on a continuum. At one end of the continuum are individuals characterized as Adaptor. These individual tend to solve problems within the boundaries established by conventional approaches. At the other end of the continuum are those individuals characterized as innovators. These persons tend to adopt idiosyncratic and unconventional approaches to problem solving.

In order to assess these thinking styles, Kirton developed an inventory, which is known as Kirton Adaption-Innovation Inventory. The inventory has 32 items and one blind item. There are three subscales in it:

1. Originality (creativity),
2. Efficiency (precise, reliable. disciplined) and
3. Rule-Group Conformity (has the proper respect for authority and rules).

1.1.1.4 Harrison and Bramson (1977, 1982) Model of Thinking Styles

Harrison and Bramson defined thinking style as ways of apprehending that include a variety of perceptions and cognitions. They

identified five preferred thinking styles viz. synthesists, idealists, analysists, realists and pragmatists. The synthesist style focuses upon essential factors, underlying assumptions, an abstract, conceptual aspect. Idealists focus on process, relationships, values and aspirations. Analysists are interested in method and plan: they seek predictability through ordinary data and focus on Concrete detail. Realists focus upon immediately apprehended facts and point to realists and resources. The pragmatists focus upon incremental, step-by-step thinking and immediate pay off and tactics.

They developed enquiry mode questionnaire to measure relative preference for five main modes of enquiry. The assessment required that each of the five pairs of 18 hypothetical situations be rated according to which is most like you and which is least like you.

1.1.1.5 Torrance et al. Model of Thinking Styles

Torrance et al. based their model on the specialized functioning on the cerebral hemispheres. Following traditional accounts they assume that the left cerebral hemisphere is the locus of logical, analytical and linear prepositional thought That is, the 4 left hemisphere seems to process information sequentially and logically **(Torrance et al. 1978. p. 1).**

In contrast, the right cerebral hemisphere is the center of Visio spatial and oppositional thought and imagination. The right hemisphere seems to process information non-linearly, simultaneously handling a variety of kinds of information. (p.1).

Torrance et. al. (1978) list specialized functions of the left and right hemisphere and they imply that persons who are right hemisphere dominant are creative (cf. "such solutions require creative thinking and the simultaneous processing of many kinds information, a specialty of right hemisphere." (p:40). While they are careful to note that in creative thinking both kinds of functioning are required, the clear implication is that right dominant persons tend to be more creative, or more likely to he creative.

1.1.1.6 Basadur and Associate (1990) Model of Thinking Styles

The research done by Basadur and his associates has introduced the concept that a unique personal style of creative Problem solving can he identified for each individual. According to this model creative problem solving is a dynamic tension between seemingly opposing forces. They stipulated two major dimensions of the process of problem solving. The first dimension is comprised of two opposite ways of gaining knowledge for ideation and evaluation.

The quadrant I orientation toward creative problem solving is called generator. The quadrant II orientation is called conceptualizer. The quadrant III orientation toward creative problem solving is called optimizer and the quadrant IV orientation is called implementer.

For assessing the creative problem solving style, the authors developed "The Creative Problem Solving Profile Inventory" Eighteen sets of 4 words are associated with the four concepts.

1.1.1.7 Epstein et at. (1996) Model of Thinking Styles

Epstein et al. identified two modes of winking styles. They are popularly known as intuitive-experimental and analytical-rational thinking styles. This is based on cognitive-experimental self-theory of personality.

In experimental system emphasis is laid upon following characteristics holistic, automatic effortless, affective, pleasure-pain oriented, associationistic connections, behaviour mediated by "vibes" from past events, encodes reality in concrete images, metaphors and narratives, more rapid processing, oriented toward immediate action, slower and more resistant to change, change with repetitive or intense experience, more crudely differentiated, broad generalization, gradient, stereotypical thinking, more crudely integrate, disassociative emotional

complexes, context- specific processing, experienced passively and precociously, we are sized by our emotions and self evidently valid "experiencing is believing".

On the other hand rational system is analytic; intentional, effortful; logical reason oriented; logical connection: behavioural mediate by conscious appraisal of events, encodes reality in abstract symbols, words and numbers, slower processing, oriented toward delayed action, changes more rapidly and easily strength of argument and news evidence, more highly differentiated, more highly integrated; context-general principles: experienced actively and consciously we are in control of our thoughts and requires justification via logic and evidence.

Initially **Epstein Meier (1989)** developed constructive thinking style inventory, which contained 108 self-reporting items. Latter on the basis of factor loading, short version of the inventory containing 31 items for measuring the two thinking styles was prepared.

1.1.1.8 Sternberg (1988) Mental Self-Government Model of Thinking Styles

The basic idea of the theory of mental self-government is that the forms of government we have in the world are not coincidental. Rather. they are external reflections of what goes on in people's minds. They represent alternative ways of organizing our thinking. Thus the forms of government are mirrors of our mind.

According to **Sternberg (1997)** there are numbers of parallels between the organization of the individual and the organization of society. For one thing, just as society needs to government itself, so we do need to govern ourselves. We need to decide on priorities, as does a government. We need to allocate our resources just as does a government and just as there are obstacles to change in govern so are there obstacles to change within ourselves.

Here overview of mental self-government theory of thinking styles is being presented. Thirteen styles of thinking have been stipulated in above-mentioned theory based on functions, forms, levels arid leanings.

Functions Based Styles

There are three functions of government: executive, legislative and judicial. Corresponding to these, there are three styles of thinking.

1. **Legislative Style**: People with this style of thinking like to come up with their own ways of doing things and prefer to decide for themselves what they will do and how they will do it. People with this style like to create their own rules and prefer problems that are not pre-structured or prefabricated.
2. **Executive Style:** People with executive style like to follow rules and prefer problems that are pre-structured or prefabricated. They like to fill in the gaps within existing structures rather than to create the structures themselves.
3. **Judicial Style:** People with this style like to evaluate rules and procedures, and prefer problems in which analyzes and evaluate existing things and ideas. The judicial stylist likes activities such as writing critiques, giving opinions, judging people and their work and evaluating programs.

Forms Based Styles

There are four forms of mental self-government: monarchic, hierarchic, oligarchic and anarchic. Each form results in a different way of approaching the world and its problems. Depending on forms, there are four thinking styles. These are described as follows:

1. **Monarchic Style:** Person with monarchic style is someone who is single minded and driven. The individual tends not to let anything in

the way of his or her in solving a problem. Monarchic people can be counted on to get a thing done, given that they have set their mind to it.

2. **Hierarchic Style:** The person with hierarchical style has a hierarchy of goals and recognizes the needs to set priorities as all goals cannot always be fulfilled, or at least fulfilled equally well. This person tends to be more accepting of complexity than is the monarchic person and recognizes the need to view problems from a number of angles so as to get priorities correctly.
3. **Oligarchic Style:** The person with Oligarchic style is like the hierarchic person in having a desire to do more than one thing within the same time frame. But unlike, hierarchic people, oligarchic people tend to be motivated by several often-completing goals of equal perceived importance. Often, these individuals feel pressured in the face of competing demands on their time and other resources. They are not always sure what to do first, or how much time to allot to each of the tasks they need to complete. However, given even minimal guidance as to the priorities of the organization in which they are involved, they can become as effective as or even more effective than people with other styles.
4. **Anarchic Style:** The anarchic style person seems to be motivated by a potpourri of needs and goals that can be difficult for him or her as well as for others to sort out. Person with anarchic style take what seems like a random approach to problems; they tend to reject systems, and especially rigid one and to fight back at whatever system they see as confining them.

Styles based on Levels

There are two thinking styles based on levels of mental self-government.

1. **Global Style:** Individuals with global style prefer to deal with relatively large and abstract issues. They ignore or don't like details and prefer to see the forest rather than trees. Often. they lose sight of the trees that constitute the forest.
2. **Local Style:** Individuals with local style like concrete problems requiring working with details. They tend to be oriented toward the pragmatics of a situation, and are down- to-earth. The danger is that they may lose the forest for the trees.

Styles based on Scope

Based on scope of mental self-government, two styles of thinking have been identified - internal and external.

1. **Internal Style :** Individuals with internal style are concerned with internal affairs that is to say, these individuals turn inward. They tend to be introverted, task-oriented, aloof and sometimes, socially less aware. They like to work alone. Essentially, their preference is to apply their intelligence to things or ideas in isolation from other people.
2. **External Style :** Individuals with external style tends to be extroverted, outgoing and people oriented. Often, they are socially sensitive and aware of what is going on with others. They like working with other people whenever possible.

Styles based on Leanings

Based leaning of mental self-government two styles of thinking have been identified - liberal and conservative.

1. Liberal Style : The individual with liberal style likes to go beyond existing rules and procedures, to maximize change and to seek situations that are somewhat ambiguous. The individual is not necessarily 'politically' liberal.

2. Conservative Style : The individual with conservative style likes to adhere to existing rules and procedures, minimize change, avoid ambiguous situations where possible and stick with familiar situations to work and professional life. The individual will be happiest in a structured and relatively predictable environment. When such structure does not exist, the individual may seek to create it.

1.1.2 THE PRINCIPLES OF THINKING STYLES

According to **Sternberg (1997)** there are 15 general points we need to understand about thinking styles. These are given below:

1. Styles are preferences in the use of abilities, not abilities themselves.
2. A match between styles and abilities creates a synergy that is more than the sum of its parts.
3. Life choices need to fit styles as well as abilities.
4. People have profiles (or patterns) of styles, not just a single style.
5. Styles are variable across tasks and situations.
6. People differ in the strength of their preferences.
7. People differ in their stylistic flexibility.
8. Styles are socialized.
9. Styles can vary across the life span.
10. Styles are measurable.
11. Styles are teachable.
12. Styles valued at one time may not be valued at another.
13. Styles valued in one place may not be valued in another.
14. Styles are not an average, good or bad - it's a question of fit.
15. We confuse stylistic fit with levels of abilities.

1.1.3 DEVELOPMENT OP THINKING STYLES

(Variables in Stylistic Development)

According to **Sternberg (1997)** there are following variables which are likely to affect development of thinking styles:

1. Culture : First variable is the culture, which is likely to affect development of thinking styles. Some cultures are likely to be more rewarding of certain styles than of others. For example, the North American emphasis on innovation and making the "better mousetrap" may lead to relatively greater reward for the legislative and liberal styles, at least among adults. National Heroes of one kind or another in the United States, such as Edison as inventor, Einstein as scientist, Jefferson as political theorist, Steven Jobs as entrepreneur and Ernest Hemingway as author, tend often to be heroes by virtues of their legislative contribution.

Other societies, such as Japan, that traditionally more highly emphasize conformity and the following of tradition may be more likely to executive and conservative styles. Similarly, in some Cultures, children are taught from an early age not to question certain religious tenets or not to question the government. Such cultures reward a conservative style and to punish a liberal one. Some religious and ethnic groups encourage a legislative and liberal thinking style that is likely to produce creative work and to eventuate in, prizes for creative achievement. Other groups discourage such thinking styles. Although internal and external styles may be found in both kinds of cultures, the respective resources of the cultures suggest that internalism will be more highly valued by the individualistic culture, externalism by the collective culture.

2. Gender - A second variable that is potentially relevant to the development of styles is gender. In particular, males are more likely to be rewarded for a legislative, internal liberal style, females for an executive or judicial, external

and conservative style. The reason for this may be - males and females will be socialized in different ways, from the time they are born.

Sternberg (1997) holds that traditionally, a legislative, liberal pattern of styles has been more acceptable in males than in females. Men were supported to set rules and women to follow them. But this tradition is already changing in many cultures.

3. Age - The third variable is age, which affects the development of thinking styles. Legislativeness is generally encouraged in the preschool young, who are encouraged to develop their creative powers in the relatively unstructured and open environment of the preschool and some homes. Once the children start going to school, the period of legislative encouragement rapidly draws to close. Children are now expected to be socialized into largely conforming values of the school. The teacher now decides what the students should do and students do it, for the most part.

4. Parenting Style - A fourth variable is parenting styles which plays crucial role in the development of thinking styles of children. For example, a monarchic parent is likely to reward a child who shows the same single - mindedness, whereas an anarchic parent would likely abhor a child beginning to show a monarchic style and to try to suppress it as unacceptable. Parents who mediate the child in ways that point to a larger than smaller issues are more likely to encourage a global style, whereas who do not themselves generalize are more likely to encourage a more local styles of thinking. The ways in which parents react can influence the styles of thinking that their children develop. For instance, children are more likely to develop legislative styles if their parents encourage the children to ask questions and where possible, to seek answers for themselves; children are more likely to develop judicial style if their parents encourage the children to be evaluative, to compare and contrast,

to analyze, to judge things both with respect to the question the children ask and with respect to the answers that are given.

5.. Schooling - One variable affecting the development of thinking style is kind of schooling. Different schools reward different styles of thinking. On the average, schools in most parts of the world are probably most rewarding of the executive, local and conservative styles of thinking. Schools see themselves as socializing agent. Intellectual independence is encouraged when the student reaches advanced graduate level. Even there, legislatively thinking is often not encouraged.

6. Occupations - Occupation also reward different thinking styles of children. An entrepreneur is likely to be rewarded for different styles than is an assembly - line worker. As individuals respond to the reward system of their chosen life pursuit, various aspects of style are more likely to be either encouraged or suppressed.

7. Socio-Economic Status - Socio-economic status is likely to affect the development of thinking styles. It is supposed that socio-economic status is negatively related to the judicial, local, conservative and oligarchic styles of children. Greater authoritarianism in the styles is seen of children of low socio-economic status.

1.1.4 EDUCATIONAL IMPORTANCE OF THINKING STYLES

The potential contributions of thinking styles to education may be described under following main rubrics:

1. Improving Instructional Methods:

Thinking styles might provide a basis for tailoring the mode of presentation as well as the nature and degree of substantive structure to functional characteristics of learners, so as to develop, compensate for, or capitalize upon student characteristics for the optimization of subject

matter learning. Contrariwise, depending on the educational goals, students might be deliberately confronted with instructional demands that arc congenial to their thinking styles so as to stimulate growth and flexibility. There is thus a continuing, but potentially fruitful, tension over the relative value of matching educational treatments to learner characteristics as opposed to mismatching them. Although matching may be facilitative when the aim is to enhance immediate subject - matter achievement, mismatching may be needed when the aim is to promote flexible and creative thinking - obstacles, opposition, conflict and challenge may be necessary to stimulate individual development and creativity. Depending upon the instructional aims, curriculum materials and procedure might be devised in stylistic terms - by varying the degree of independent study versus group instruction, cognitive controls and stylistic abilities might thus serve to increase functional options for individualization of instruction.

2. Enriching Teacher Behaviour and Conceptions :

Teacher performance might be improved through heightened awareness of thinking styles, which could lead to increased flexibility in the teacher's own stylistic preference for particular evaluation and teaching methods. Increased teacher awareness of stylistic differences might also improve teacher-student communication by increasing sensitivity to verbal and non-verbal stylistic cues and to the communicative difficulties attendant upon stylistic mismatch. Teachers and students who are similar in thinking styles tend to view each other with greater mutual esteem than do those who are dissimilar; they also tend to communicate more effectively, as if they were on the same wavelength. If teachers and students were more aware of stylistic differences, these match-mismatch effects be considerably attenuated through resulting improved communication.

3. Enhancing Student Learning and Thinking Strategies :

By increasing student awareness of thinking styles and their implications for learning, communication and social functioning, the teacher might expand student purviews about the range of alternative thinking strategies that are congenial to their styles but those that are uncongenial as well. Since strategies may be more easily learned than styles and more amenable to alteration, teacher might thereby increase the student's strategic repertoire and the likelihood that strategies, even stylistically uncongenial ones, will be selectively and appropriately applied as a function of varied task requirement.

4. Expanding Guidance and Vocational Decision-Making :

Since thinking styles are related to vocational preferences and to choice of major field as well as to choice of specialization and to relative performance within fields, knowledge of students, thinking styles should contribute to improved educational decision-making. Moreover, since thinking styles have implications for the ways in which information is selected, processed and used, styles should be taken into account in optimizing student's involvement in the guidance process.

5. **Broadening Educational Goals and Outcomes :**

The pervasiveness of thinking styles suggests that capitalizing upon styles and coping with their restrictiveness might become explicit goals of education—that schools and colleges should be concerned not just with knowledge acquisition but also with the student's manner of thinking. The concern invokes a number of process goals and associated process outcomes to be evaluated, such as the development of strategic thinking, the enrichment of the student's repertoire of procedural alternatives, and the development of flexibility the utilization of multiple thinking modes.

6. Tu:ning the Stylistic Demands of Learning Environment :

Educational environments make stylistic demands as well as intellective demands, but the stylistic demands of most current programme and settings are usually so intermixed that they neither uniformly match nor uniformly mismatch learner styles. Rather, they are generally misaligned with stylistic characteristics of learners, with some environmental and program features facilitating and others debilitating performance. This often puts students in a double bind. **(Chickering, 1976)**

From a thinking style perspective, we are in a position to explore the stylistic requirements of different learning environments with a view toward developing style-consistent modules of instructional method. Such modules might include suitable teaching methods. Such explorations may help us better understand and appreciate the subtle stylistic demands of the conditions of learning.

7. Render Help in Adopting Suitable Assessment Methods :

It is assumed that different methods of assessment tend to benefit different thinking styles. For instance, multiple-choice testing is very much oriented toward executive and local thinkers. Similarly, short answer type tests are most compatible to executive, local, hierarchical and internal thinking. Essay tests do not benefit particular styles, perse. Rather, whom they benefit depends on how the essays are evaluated. Projects and portfolios tend to reward styles that are quite different from those typically rewarded by short- answer and multiple-choice tests. Even interviews tend to reward some styles over others. Therefore, there is a need to correspondence between thinking styles and different formats of tests. Having complete knowledge of testing and thinking styles, the teacher is in best position to adopt suitable methods of assessment in the classroom.

Thus, it may be noted instructor can facilitate learner's use of thinking styles information for helping them to understand as thinkers, for encouraging them to expand their thinking styles, for using a variety of learning approaches, for creating an environment in which diversity can thrive; for creating a climate in which collaboration exists and for preparing them to be tested according to different styles of thinking. Apart from teacher and learner, curriculum designers and educational administrators may also be benefited from the knowledge of thinking styles in various ways.

1.1.5 CONCEPT OF PERSONALITY

Personality is an arbitrary term to be defined in boundaries. The term personality has been derived from a Latin word 'Persona" which means a mask that the Greek actors commonly used for acting. Personality means the effect, which an individual leaves on other people.

Personality has been described differently by various psychologists. Psychologists define personality as

- A stimulus
- Summative approach
- Integrative approach
- Totality view
- As a factor of adjustment

Personality can thus be assessed as a stable system of complex characteristics by which the life pattern of an individual may be identified. The creative energies of the future therefore must be at least partially directed towards the problems that accompany the development of increased potential for harm.

According to **Torrance (1965),** it becomes absolutely necessary that serious attempts must be made to ensure the development of creative development.

Torrance (1969) says that deplorable waste of human talents is to be prevented and if creatively gifted students are not to use the paths of delinquency, mental illness or at least the life of mediocrity and unrealized potentialities.

According to **Parnes** (1971), society's mental health can be described as the difference between the potential and actual civilization of every person in the population.

The term personality has no single standard definition. The social scientists who formulated the definition kept in view one of the three things about a person

(i) His external appearance and behaviour or social stimulus value,

(ii) His awareness of self as a permanent organizing force,

(iii) His particular pattern or organization of measurable traits both inner and outer ones.

Personality as a Social Value : Ruch (1967) says that an individual's social stimulus value is the effect he has upon others. It is determined by all those characteristics and qualities of the individual that act as a stimuli for other people.

Personality as a Self-hood : Ruch (1967) says that certain psychologists emphasize that for early childhood, the individual's concept of self is an important factor in guiding both his immediate behaviour and the further development of his personality.

Personality as a complex of Interacting Traits : Another approach to personality is to study the measurable traits of the individual. Traits are defined as characteristics that can be observed and tested objectively or inferred from observable and measurable behaviour. These are often

called as dimensions of personality, because they can be measured as quantitative continuum.

It has been found that no definition is completely satisfying.

Allport's (1961) definition is widely accepted which defines personality as the dynamic organization within the individual of those psycho- physical systems that determine his characteristics, behaviour and thought'.

Cattell (1952) observed that, 'It is a truism the most human affairs, political, social, commercial, cultural, domestic-hinge on issues of personality'.

Richand Sochacht (1971) has shown that a distinctive personality is not simply a lofty ideas but amounts to an existential imperative.

Sochacht (1971) says that "A person is not as he should be to the extent he fails to develop a distinctive personality."

One way to proceed is to work for the release of creative analysis. which will make such inventions possible. Through bringing creative energies to bear on the activities of everyday existence, the reintegration of the fragmented self into a meaningful, distinctive personality becomes a real possibility.

The three basic dimensions (defined as clusters or groups of correlated traits) derived by **Eysenck** through his work are :

1. Introversion Extroversion
2. Neuroticism (emotional instability — emotional stability)
3. Psychoticism

The three basic dimensions refer to definite personality type i.e. introvert, extrovert, neurotic, stable, high psychotic and low Psychotic. However, the term 'type' as applied by Eysenck stands clearly for a

dimension along a scale with a low end and high end for putting people at various points between the two extremes. While the high end on the first dimension introversion-extroversion, includes the highly extrovert recognized as sociable, outgoing, impulsive, optimistic and jolly people the lower end typifies the highly introvert recognized as quiet, introspective, reserved, reflect, disciplined and well ordered people. Eysenck believed that purely extrovert or purely introvert people were rarely found and he, therefore preferred to use a dimension, i.e. a continuum ranging from introversion to extroversion instead of naming types as introverts and extroverts.

The second major dimension suggested by Eysenck involves emotional instability at the lower end and emotional stability at the upper end-describing people as neurotic and not neurotic (i.e. stable). Thus, at its lower end are the persons who are moody, touchy, anxious or restless, at the upper end are the persons who are stable, calm, carefree, even-tempered and dependable.

The third dimension is psychoticism. The people high on this dimension tend to be solitary, insensitive, egocentric, impersonal. impulsive and opposed to accepted social norms while those scoring low are found to be more empathic and less adventurous and bold. However, Maudsley Personality Inventory was developed based on two dimensions i.e. Extroversion and Neuroticism.

1.1.6 EDUCATIONAL IMPORTANCE OF PERSONALITY

Eysenck's most recently test of personality (EPQ, 1975) measures neuroticism- stability, extroversion-introversion, and high Psychoticism low psychoticism. Cattell's tests on the other hand measures up to 16 traits or factors, though he accepts that some of these interrelate and may be related to underlying source traits similar to those of Eysenck.

A number of studies have attempted to show a relationship between Eysenck's or Cattell's tests and educational attainment but results have been disappointing and variable. There is, for example, some link between extroversion and success at primary school level, and some link between neuroticism and certain kinds of success and failure in higher education, but the correlations are small and somewhat localized. This doesn't mean however, that the dimensions isolated by Eysenck and Cattell have little relevance for education.

It means simply that the relationship between them and academic success and failure in highly complex and difficult to measure by current research methodology. The teacher's own personality, for example, enters crucially into equation. Thus extroverted children may perhaps do significantly better than introverted children in the primary school, provided their teacher is also extroverted. And neurotic children may get by quite happy provided their teacher is sensitive to their problems.

Teaching materials and teaching methods will come also into it. Arts subjects could be more suitable for introverts and science subjects for extroverts may be, though a lot will depend upon the particular approach of the teachers or lecturers concerned and the kind of study habits they demand from their students. Age and ability levels also affect the demand upon teacher.

Classroom interactions, complexity has different kind of relation with personality effect upon student's achievement. Student personality is not only related to achievement but also the ways they think, they solve problem and learn.

Teacher's personality also plays a significant role in teaching-learning process. There is no doubt that good teacher have certain identifiable features of personality such as out going/extroverted, well

balanced/stability etc. Teacher personality also not only affects the achievement of the students, their attitude toward learning but also their ways of learning and thinking. Several empirical studies have extended the support to it.

A number of studies have shown that extroverts are more field-independent than introverts on a number of measures of the phenomenon **(Loo, 1976, Fine and Dan Forth, *1975).*** There seems to be little consistent difference between neurotic and stable subjects with respect to field-dependence. **Arora and Murthy *(1975)*** found that clinical neurotic subject was more field-dependent than normal. This clearly supports the view that thinking style may also have relationship with personality type.

Thus we find that students and teacher personality undoubtedly plays a significant role in education.

1.1.7 CONCEPT OF MOTIVATION

Behaviourists explain learning in terms of stimuli in the environment and responses made by the individual. Cognitive psychologists concern themselves with individual's perceptions of the world, while motivation theorists emphasize the connection between behaviour and needs, drives, goals and motives.

A basic assumption in motivation theory is that people behave as they, do to reduce their needs. A need is a requirement that must be met for optional adjustment to the environment. There are several kinds of needs. Certain needs such as food and water are necessary to survive. Because of their essential nature, they are called primary needs. Similarly there are secondary and tertiary needs, which are essential to physical survival but their fulfillment does make a positive significant contribution towards our adjustment.

Motivation is concerned with the energizing and directing of behaviour, by its vary nature, is energized and directed even at the most primitive levels.

H.W. Bernard has defined motivation as "Motivation refers to all those phenomena which are involved in the stimulation of action towards particular objectives where previously there was little or no movement towards those goals".

Atkinson defined motivation as "The term motivation refers to the arousal of tendency to act to produce one or more effects."

Thus by motivation, we usually think of what is that prompts or causes a person to act. In scientific terms, motivation is an "energizing condition of an organism that serves to direct the organism's behaviour. usually a goal or goals of certain class".

Motivation thus includes both energy (drive) and direction (learned ways to satisfy our needs). Human motivation is a complex process. The drive may be intrinsic or internal or extrinsic viz. external. It implies that based on the type of drive, motivation can be classified into two types:

1. Intrinsic motivation
2. Extrinsic motivation.

INTRINSIC MOTIVATION

"Motivation" is an umbrella term having a wide variety of connotations and denotations. On the one hand, the classroom teacher sees motivation as the characteristic that makes the good" student learn; the "lazy" student is said by the teacher to be unmotivated. On the other hand, the psychologist gives motivation a much broader meaning; it refers to the process involved in the arousing, directing and sustaining of behaviour.

When we see people engaged in action to display competency or exercise control over what is happening, we infer they are intrinsically

motivated. **(Deci, 1975; Kukla 1978; Notz, 1975).** Intrinsic motivation is what a learner brings into the learning situation. **De Charms (1971)** believes that a person's primary motivation is to produce change in the environment. The more internally controlled a person is, the more intrinsically satisfying external events are. Intrinsic motivation depends upon factors hinging on unharmonious or dissonant relations within the learning process, for example the notion of perceptual conflict or cognitive imbalance. Reward in this process is closely related to the thought process involved. Satisfaction in solving a problem or restoring a conflict is rewarding the learner. **Berylene (1960, 1963)** while discussing intrinsic motivation introduced the term 'epistemic curiosity' to refer to knowledge seeking behaviour including questioning, observation, problem solving. Epistemic curiosity then is concerned with pursuing knowledge for its own sake rather than for any reward extraneous to it. **Mc.V. Hunt (1971)** in a discussion of intrinsic motivation in young children, attaches great importance to complexity in relation to children's interest and curiosity.

Knowledgeable enthusiasts, whether children or adults, are those who become committed to an interest for its own sake and once committed there is an even stronger tendency to remain involved.

Hunt (1960) maintains that if activity is intrinsic in living organism. It is not necessary to see all behaviour as a matter of either reducing or avoiding stimulation.

Hunt (1964) suggests that incongruity may serve as motivation. He writes, "The temperature at which the thermostat is set supplies a standard against which the temperature of the room is continuously being tested."

The Dictionary of Behavioural Sciences

The Dictionary of Behavioural Sciences defines 'Intrinsic Motivation' as an incentive, which originates wits' in the behaviour rather than externally **(Wolman, 1973, p. 243).** According to **White (1959) and**

Bruner (1966), one is intrinsically motivated to perform an activity when he receives no apparent reward except the activity itself. **Deci (1978)** holds that intrinsic motivation obtains whenever actor locates causality for his activity with in himself. **Misra (1989)** also states that a person is considered as intrinsically motivated if he performs an activity for his own sake.

Taking a broader perspective of intrinsic motivation **Csikszentmihalyi (1978)** has conducted that a considerable proportion of behaviour involves goals and rewards that arise out of direct involvement with the on going activity these goals may be called sources of emergent motivation. However, deriving motivation from interactions with tasks requires that a situation should provide information to the person that his or her actions are meeting a set of challenges in the environment. Also this system of motivation requires development of skills to utilize a larger number of channels of information in varied contexts.

Another approach to intrinsic motivation considers it as an individual disposition having cross-situational generality. According to **Haywood (1971),** people vary in likelihood to be motivated by the task intrinsic or task extrinsic characteristics. This view implies existence of individual differences in the disposition to respond differently to incentives, which can be specified as task intrinsic or task extrinsic.

Thus, it is obvious that intrinsic motivation have been approached from divergent viewpoints. It has been treated as individual's preference from an activity without any external reward, as an emergent motivation and as an enduring disposition with cross-situational generality to be motivated by within-task-factors.

Certainly there is a correlation among the learner's capacity for incongruity the information he or she possess, past success as a learner and so on, but the extent of this correlation remain to be determined by future research. At present, it seems accurate to state that for most learners too wide a gap will be frustrating and too small a gap will be boring.

EXTRINSIC MOTIVATION

An individual's values are subjective determinants of his motivational process. Though a value is related to an interest, it is not quite the same. A value somewhat like an ideal emphasizes a way of life. It is a perceptive set in one's behavioural pattern.

In relation to the determinants, motivation is spoken of as primary (intrinsic) or secondary (extrinsic). You do something because you enjoy the process of doing it, your motive is primary or intrinsic one. If your goal is the direct accomplishment of your motive, it is a primary or intrinsic reward.

Extrinsic motivation inheres when the source of reward or punishment lies external to the individual and in the control of other people who determine the appropriateness of the behaviour of the individual. People are motivated to maximize satisfaction and minimize dissatisfaction; when they obtain satisfaction from other, those others became agents of control.

Deci (1978) holds that extrinsic motivation obtains whenever the actor locates causality in the external environment. It is always directed towards the rewards for which the activity is only instrumental.

It is apparent that for Maslow, the goal of learning is a "human goal, the humanistic goal, the goal so far as human beings are concerned- is ultimately the self actualization' of a person, the becoming fully human, the development of the fullest height that the human species can stand up to or that a particular individual can come to." That is to say, it is learning to be the best person that one is capable of becoming. It is learning to grow toward full self- actualization or toward full humanness; the realization of one's profoundest humanity. Intrinsic learning is learning that fructifies in self-actualization or growing to full humanness.

Extrinsic learning on the other hand is the process that is essentially external rather than internal, is characteristics of the behaviour-learning theorists who exposed the stimulus response theories of learning.

According to **Mishra (1989)** a person is considered extrinsically motivated if the activity is performed to an end i.e. to obtain a reward or to avoid punishment.

Extrinsic learning as argued by Maslow, is learning from the outside, learning of the impersonal or arbitrary, associations; of arbitrary conditioning, i.e. of arbitrary meaning and responses. In this kind of learning, most often it is not the person himself who decides, but rather a teacher or an experimenter who says, 'I will use the buzzer", 'I will use the bell", "I will use a red light" and most important, *I* will reinforce this but not that." In this sense the learning is extrinsic to the learner, extrinsic to the personality and is extrinsic also in the sense of collecting associations, conditionings, habits or modes of action.

1.1.8 EDUCATIONAL IMPORTANCE OF INTRINSIC AND EXTRINSIC MOTIVATION

Motivation is a very complex phenomenon, which is influenced by multiple variables operating within the organism and in the environment. The various factors, which influence motivation, are - psychological. emotions, habit, mental sets, values and attitudes. In addition to these factors, the environmental factors and incentive also play a vital role in the process of motivation.

At normal levels, tension is highly beneficial from the standpoint of the individual's maximum self-realization for, without this powerful force impelling him to regain equilibrium through the satisfaction of his need, he would remain forever childish, ignorant and incompetent.

Both intrinsic and extrinsic stimuli are involved in the motivation of behaviour. The intrinsic stimuli arouse the individual to activity and sensitize him to certain aspects of his environment while stimuli arouse and promote need-seeking behaviour. Motivated behaviour is frequently triggered more by extrinsic stimuli than by internal needs.

The determinants of human behaviour - whether called needs, drives, motives or purposes are generally encompassed under the broad heading of motivation which has, therefore at least two fundamental components: a need state and an external goal. Motivation thus may be defined as a state of the organism in which its energies are mobilized selectively toward the attainment of a given goal: More specifically, motives serve three important functions:

1. They energize, i.e. they activate and sensitize the organism toward certain stimuli.
2. They direct the behaviour toward certain goals and
3. They reinforce the behaviour i.e. effective in the attainment of derived goals.

Motivation, thus, plays a key role in learning process. Studies have shown that higher level of motivation is found in high achievers as compared to low achievers. In other words, high level of motivation for learning facilitates academic attainment of the learners even after controlling the ability of learner, motivation has found to increase the academic level of the students. Intrinsic motivation has close link with deep studying and extrinsic motivation with surface studying. In number of studies of styles (cognitive and learning) motivation has been observed an important factor.

Motivation is not only of paramount significance for learners; it is also of considerable importance for teachers. Teacher's motivation to work

is an essential component of teacher effectiveness and efficiency, which in turn does influence learning outcomes and personality of the learners.

Hence, motivation has much educational value as **Richardson (2000)** states that academic progress may depend at least as much upon the motivational aspects of learning.

1.2 STATEMENT OF THE PROBLEM

In the past several years, there has been extensive research on various approaches to college teaching. But no one approach or method has been found to be consistently superior to all others. However that may only be showing that no one approach is superior for the mythical average students. The more important question is to determine which student learn best under what conditions. An emerging area of research that holds promise in helping us answer this question is student's styles of learning and thinking.

It is amply evident from the foregoing presentations that the research area of styles of thinking is new one particularly for Indian researchers. There are several variables, which need to be investigated in relation to thinking styles of college students. Significant among them are academic achievement, gender, academic discipline/stream, motivation and personality type. The proposed study has been designed to address the following research question –

i. Are there significant differences in styles of thinking of college students having varying levels of academic achievement. i.e. high, average and low?

ii. Are there significant gender differences in the styles of thinking of college students?

iii. Do college students belonging to science, arts and commerce streams exhibit significant differences in their styles of thinking?

iv. Do significant differences exist in styles of thinking of college students having different types of personality?

v. Do college students with high and low levels of Intrinsic' and 'Extrinsic' motivations show significant differences in their styles of thinking?

The above research questions are the integral part of the research problem. Thus the problem of the study was stated as follows:

"A STUDY OF THINKING STYLES OF COLLEGE STUDENTS IN RELATION TO SELECTED COGNITIVE AND NON-COGNITIVE FACTORS"

1.3 NEED AND JUSTIFICATION OF THE STUDY

Educators hold that students learn and think in unique individualized ways whether they belong to school, college or university level. Post- secondary education or higher education is becoming increasingly important in every society of developed or developing countries. Particularly a society of people who make mid life career changes or advance their skills or who must work out of necessity or those whose leisure time permit higher education, all contribute to increase demand of higher education through formal or non-formal modes. Therefore the question of how to teach college level students in more effective and efficient ways is becoming pertinent day-by-day.

In search of solution of teaching problems college students, some work has been done on thinking styles of students in foreign countries. But in India no such attempt has been made so far. Hence there is a considerable scope to probe the area styles of thinking of college students in socio-cultural milieu of Indian society.

Thinking styles are very important components of the learning processes of college education. Their understanding is highly desirable if we have to obtain a comprehensive picture of learning processes of

college students and to base our teaching efforts on the knowledge of the same in order to inject quality control in educational process.

In view of the above, the need of the proposed study is vividly clear and the study was quite justified to undertake.

1.4 OBJECTIVES

The following objectives were realized in the proposed study –

1. To find out the differences in thinking styles of college students in relation to their academic achievement.
2. To Study the differences in thinking styles of college students in relation to their gender.
3. To Study the differences in thinking styles of college students belonging to science, arts and commerce streams.
4. To find out the differences in thinking styles of college students in relation to their personality types.
5. To find out the differences in thinking styles of college students in relation to their motivational orientations.

1.5 HYPOTHESES

The following hypotheses have been tested in the proposed study :

1. There will be significant differences in thinking styles of college students having high, average and low levels of academic achievement.
2. There will be significant differences in thinking styles of male and female college students.
3. There will be significant differences in thinking styles of college students belonging to science, arts and commerce streams.
4. There will be significant differences in thinking styles of college students having :
   (a) extrovert type and introvert type personality and
   (b) neurotic type and stable type personality.

5. There will be significant differences in thinking styles of college students having high and low levels of motivational orientations Viz.

   (a) high and low levels of intrinsic motivation and

   (b) high and low levels of extrinsic motivation.

However, for the sake of convenience of testing each hypothesis was into specific hypotheses based on thinking styles.

1.6 SCOPE AND DELIMITATIONS

Scope and delimitations of the present study may be understood in terms of the objectives, hypotheses, research method, population sampling, variables, tools, and statistical technique etc.

- The study was delimited in terms of its objectives. These objectives were concerned with determining the differences in thinking styles in relation to college student's cognitive and non-cognitive factors.
- Cognitive factors was academic achievement and non cognitive factors were gender, stream, personality type and motivational orientation.
- The study was concerned with testing of non-directional research hypotheses.
- The study was carried out through descriptive methods of research.
- The population of the study comprised college students of final year studying in science, arts and commerce streams.
- The sample was drawn from the colleges of Jhansi only. It included both - govt. managed and privately managed institutions. The sample included subjects of both sexes.
- Institutions were, selected through random method but the sample was drawn through random cluster sampling technique.

- The study was further delimited in terms of variables. Academic achievement, gender, stream, personality type and motivational orientation (intrinsic and extrinsic) were regarded Independent variables. Thinking styles were treated as Criterion variables.
- The data were collected with the help of Torrance et.al's SOLAT, Sternberg et.al's Thinking Style Inventory, Eysenck's MPI and Ambile et al's Work Preference Inventory. Academic Achievements marks were noted from gazette.
- Subjects were classified by using M ± 1 SD formula on academic achievement, personality type (Extraversion and Neuroticism) and motivation orientation (Intrinsic and Extrinsic).
- The data on criterion variables were analyzed by 't' test and one- way - Analysis of variance technique. Post-hoc analysis was done again by 't' test. Graphs were used to depict differences in mean scores of thinking styles in respect of various groups.
- The study was delimited in terms of time and financial resources also.

1.7 DEFINITION OF THE KEY TERMS USED

The key terms which have been used frequently in the present study have been defined here to bring precision and clarity:

THINKING STYLE : Refers the way one thinks or prefers to think using particular cerebral hemisphere or mental ability.

- **Left Hemispheric Style** : Refers to inclination to use the left cerebral hemisphere in information processing.
- **Right Hemispheric Style** : Refers to inclination to use the right cerebral hemisphere in information processing.
- **Integrative Style** : Refers to inclination to make use of capabilities of both cerebral hemispheres in information processing.

- **Legislative Style** : Person with this style is concerned with creating, formulating imaging and planning; likes to formulate his / her own activities.
- **Executive Style** : Person with this style is concerned with implementing and doing. likes to pursue activities structured by others.
- **Judicial Style** : Person with this style is concerned judging, evaluating and comparing; likes to judge the products of others activities, or to judge the others themselves.
- **Monarchic Style :** Person with this style tends to focus single-mindedly on one goal or need at a time a single goal or way of doing things predominates.
- **Hierarchic Style :** Person tends to allow for multiple goals, each of which may have a different priority; knows how to perform multiple asks within the same time frame, setting priorities for getting them done.
- **Oligarchic Style** : Person with this style tends to allow for multiple all of which are equally important: likes to do multiple tasks the same time frame but has difficulty setting priorities for them done.
- **Anarchic Style** : Person with this style tends to eschew rules, procedures and formal systems; often has difficulty adjusting to school as a system.
- **Global Style** : Person with this style prefers to deal with the large picture and abstractions.
- **Local Style** Person with this style prefers to deal with details and issues.
- **Liberal Style :** Person with this style likes to do things in new ways, to have change in his / her life, and to defy conventions.
- **Conservative Style :** Person with this style likes traditions and stability; prefers doing things in tried and true ways.

PERSONALITY TYPE : Refers to type of personality based on two dimensions as measured by MPI of Eysenck e.g. extroversive and introversive, neurotic and stable types.

- **Extrovert (Extroversive) Type** : Refers to type of personality, which is least centered around shyness and withdrawal and is more social Introvert (Introversive) Type: Refers to type of personality which is shyness and withdrawal centered.
- **Neurotic Type** : Refers to the general emotional liability of a person, his emotional over responsiveness and his liability to neurotic break down under stress.
- **Stable Type:** Refers to neurotic stability under stress.

MOTIVATION ORIENTATION : Refers to preference for intrinsic and extrinsic motivation as measured by Student Work Preference Inventory of Amabile et al.

NON-COGNITIVE FACTORS : Refers to academic achievement of students.

NON-COGNITIVE FACTORS : Refers to gender stream, personality type and motivational orientation.

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CHAPTER – II

REVIEW OF RELATED RESEARCH

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REVIEW OF RELATED RESEARCH

2.0 INTRODUCTION

In the field of education, as in other fields too, the researchers need to acquire up-to-date information about what has been thought and done in the particular area from which he intends to take up a problem for research.

Survey of related literature, besides forming one of the early chapters in a research report for orienting the readers serves some other purposes. **Good**, **Bar** and **Scates (1954)** have mentioned the following purposes of related research:

- To show whether the evidence already available solves the problem adequately without further investigation and thus to avoid the risk of duplication.
- To provide ideas, theories, explanations or hypotheses valuable in formulating the problem.
- To suggest methods of research appropriate to the problem.
- To locate comparative data useful in the interpretation of results and
- To contribute to the general scholarship of the investigator.

Bruce W. Tuckman (1978) has enumerated the following purposes of the review

- Discovering important variables.
- Distinguishing what has been done from what needs to be done.
- Synthesizing the available studies to have perspective.
- Determining meanings, relevance of the study and relationship the study and its deviation from the available studies.

Edward L. Vockell (1983) has pointed out the following two purposes:

1. The main purpose of the review is to put the hypothesis to be examined in the research report in to its proper context.
2. Secondary purpose of this part of the report is to provide readers with guidelines regarding where they can look to find more information and to establish the author's credential by letting readers know that the researcher is aware of what has been going on with regard to the current and related topics.

In view of the importance of literature of related research, review was done in comprehensive manner and the same has been given in the present chapter.

(SECTION -I)

2.1 LEARNER'S COGNITIVE CHARACTERSITICS AND STYLES OF THINKING

A number of studies have been conducted on styles of thinking in relation to learner's cognitive characteristics such as intelligence, creativity and academic achievement. Some research studies have been reviewed here with reference to these variables.

2.1.1 Intelligence and Styles of Thinking

Some studies are available on the relationship of intelligence and thinking styles. Here review of such studies has been provided :

Kirby and Das (1978) studied the relationship between information processing styles and cognitive abilities: Non-verbal intelligence measured through Raven's Coloured Progressive Matrices was important variable. It was found that simultaneous processing was primarily related to spatial ability. It was also related to lesser extent, to

both memory and inductive-deductive reasoning abilities of the children. Both simultaneous and successive processing were related to memory ability. No evidence was found that either of the two modes of thinking could be equated to a reasoning or memory.

Torrance and Ball (1977) observed that in the analysis of data obtained from 161 students who had participated in summer programme. Those with right hemispheric preferences reported more application of learning to practical situation than those who had left hemispheric preferences.

Cody (1983) compared thinking styles of average, gifted and highly gifted students in grades 5 through 12. The investigator found that average intelligent students showed more integrated and left hemispheric style and gifted students had higher level of integrated style and right hemispheric style of thinking. Further highly gifted students indicated more integrated and right hemispheric style.

Mein (1986) reported that there were significant differences between the high verbal ability low performance, and high performance low verbal ability groups on the left-brain style and integrated-brain style scores latter group tended to be more integrated in style of thinking than former group.

Sherwood (1984) concluded that cognitive growth and onset of formed thinking showed no significant relationship on hemispheric styles of thinking.

Milburn (1984) studied the relationship between scores on your Style of Thinking by Torrance and Wechsler Intelligence Scale for Children Revised (WISCR). Using a stepwise discriminate analysis to determine the relationship between intelligence and hemispheric processing preferences, the most discriminating function was not found to be significant.

Kershner and **Ledger (1985)** found that there was statistically significant main effect of IQ; average children preferred left hemisphere style of thinking to a great extent than the gifted children.

Sternberg and Grigorenko (1993) studied the thinking styles of the gifted children. The findings indicated that the correlation of the measure of mental self-govt. with IQ. Three styles correlated significantly with scholastic aptitude of math (judicial, global and liberal, all positively), but not with SAT verbal. There was no difference between gifted and non-gifted children. However, on requiring children actually to do tasks, the gifted children proved to be more legislative, judicial and liberal than non-gifted children, but less executive.

Sumathy (1993) found that right hemisphere dominant students excel the left hemisphere dominant students in their divergent thinking.

Sternberg (1997) reported that the legislative and the judicial styles were positively correlated with scores on the ability test. The correlations were modest, however, for the legislative, 0.17 with analytical thinking, 0.19 with creative thinking, for the judicial style, 0.15 with analytical thinking, 0.20 with creative thinking, 0.23 with practical thinking. The executive style, in contrast, was negatively correlated with the scores on the test - 0.15 with analytical thinking, and -0.16 with creative thinking.

Thus it may be observed that intelligence appears to be a significant variable in case of styles of thinking.

2.1.2 Creativity and Styles of Thinking

Thinking styles have also been studied by some researchers in relation to creativity. For instance:

Wheatley (1977) concluded that right hemisphere style of thinking is the sight of creative thought.

Torrance and **Moured (1978)** and **Torrance** and **Moured (1979)** investigated styles of thinking of graduate students. In these investigations, left hemispheric style was found to be related to less creativity than right hemispheric style and integrated hemispheric style.

Torrance and **Sato (1979)** observed that hemispheric style of thinking scores were related with the scores of several indices of creative thinking.

Fitzgerald and Hattie (1983) conducted a study to evaluate your Style of Learning and Thinking Inventory and concluded that a model of right and left-brain dominance to creativity has little value. This study found evidence that conflicted with Torrance et al's findings.

Torrance and **Frasier (1983)** found that creativity was positively related to the right hemisphere style and negatively related left hemisphere style of thinking.

Milburn (1984) investigated the hemispheric style of thinking preference and hemispheric processing abilities in high and low creative gifted preadolescents. Your Style of Learning and Thinking (Form-B), Weschler Intelligence Test and Rating Scale of Behavioural characteristics. The results revealed that the significant difference was found between preferences for left, right and integrated activities for both. Both groups appeared to prefer integrated activities.

Taggart et al. (1985) reported that verbal fluency, figural fluency, verbal flexibility - all were positively correlated to right hemispheric dominance.

Kershfler and Ledger (1985) reported that highly creative children irrespective of their IQ, preferred integrated styles of thinking. Further, high IQ-low creative children had greater preference for right hemispheric style of thinking.

Goldsmith (1987) conducted a study to explore the relationship of creative style to the level of creativity using data from 96 college students on Kirton Adaption-Innovation Inventory (A measure of Creative Style) and from other scales - What kind of person are you? Something about myself and Jackson's Personality Inventory Innovation-Risk subscales.

The results revealed that most of the inter-correlations were positive and moderate in size, indicating that three creative scales mix creative level with creative styles to different degrees.

Mitchell (1987-88) reported that hemisphere styles of thinking and creative measurement were significantly related. More creative students tended to have higher level of right hemisphere style.

Al-Sabaty and Gary (1989) explored the relationship between creativity and right, left and integrated thinking styles. The two creative measures (How do You Think Inventory and Thinking positively with Sounds and Words) and Your Style of Learning and thinking (SQLAT) were administered to 109 undergraduate students. The HDYT scores were positively related with right thinking style and negatively correlated with left thinking style scores. The results of TCSW were not so clear. The findings were consistent with the notion that right hemispheric thinking style was related to known traits of creative people.

Borgert (1990) found that both right and left hemisphere preference groups demonstrated an increase in creativity.

Kunlar, Holman and **Redegeair (1991)** found that the differences in creativity styles of Freshman students in relation to their creativity level. The data analysis yields that creative group showed (a) employing a greater number of techniques in order to be creative than somewhat creative group and the least creative group and (b) To be less motivated in their creative efforts by the goal of a developing a final product than the least creative group. When item analysis was done a significantly

greater percentage of creative students, relative to the less creative ones, were found to report "new ideas possess them and guide them through competition almost automatically", "working in many ideas simultaneously", "having a lot of ideas both workable and non workable", "showing the creative products to other people and enjoying the process of creative new ideas whether they lead to a final product or not."

Sternberg and **Lubart (1995)** found that legislative and liberal styles of creative thinking were associated with creative strategies.

It is evident that certain thinking styles are more conducive for the development of creativity among the students.

2.1.3 Artistic Potential, Problem Solving Ability and Styles of Thinking

A few studies are available on the relationship of above-mentioned variable and thinking styles :

Wagner (1978) concluded that there is a perceptive account on the relationship between drama and the right hemisphere.

Torrance and **Frasier (1983)** reported that artistic potential was negatively related to left hemisphere style.

Houtz and **Frankel (1988)** found that students categorized as having integrated style solved more high imagery anagrams than students with other styles of thinking.

Sengoltaiah (1989) found that right hemisphere dominant students are at higher level in problem solving ability in mathematics at high school level.

2.1.4 Academic Achievement and Styles of Thinking

Some researchers in western countries have explored the relationship between styles of thinking and academic achievement of students. Here an attempt has been made to review these studies:

Samples (1976) and **Paddy and Hostler (1979)** found that right hemispheric children were under achievers.

Black (1983) reported that matching of teaching hemisphere style produce significant learning outcomes.

Mc Bratney (1983) observed that students receiving right brain instruction scored significantly higher on language subject of the CTBS. However, the second hypothesis stating that students receiving right brain style instruction score significantly higher in the Spelling subject of the CTBS was not statistically supported.

Sinatra (1983) and **Harness et. al (1984)** concluded that students who show right hemisphere strengths seem to be at a greater risk for difficulties in reading and learning in school than those who show left hemispheric strengths.

Torrance and **Frasier (1983)** found that academic performance was negatively related to left hemisphere style of thinking.

Brennan (1984) found that there was no significant difference evidenced in students with left and right-brained style on a test of mathematics achievement.

Jarsonbeck (1984) reported that there were more rights among low achieving students and more lefts among higher achieving maths students.

Okabayashi and **Torrance (1984)** reported that under achievers had significantly higher scores on right style of thinking their high achieving counterparts. The under achievers were also lower than the other two groups on the integrative style.

Taggart and Torrance (1984) reported that left hemispheric preference scores relate positively to hard science performance more than right hemispheric preference.

Borg (1985) did not find any relationship between hemisphericity and grade point averages.

Holler (1985) reported that there was no significant relationship between reading achievement and thinking styles.

Grun (1986) reported that hemispheric styles were unrelated to grade point averages.

Taylor (1986) explored the relationship of brain dominance to student success in selected classes at Tri-Country technical college. Torrance's Human Information Processing Survey (HIP survey) was used to assess brain dominance. The study yielded the following results: brain dominance did not influence classroom success.

Bruno (1988) observed that data yielded significant differences in math's achievement when students were matched / mismatched with instrumental strategies congruent incongruent with their hemisphere styles. Students achieved significantly higher when taught with complementary instructional strategies.

Roubinek (1989) concluded that thinking style was not related to reading achievement.

Kummerow (1989) found that there was no significant relationship between the hemisphere dominance and the variables like academic success.

Donna et al. (1990) reported that neither hemisphericity style was related to reading achievement.

Voelz (1994) reported that brain based style affect grades (teacher made achievement) but not achievement knowledge (standard achievement).

Epstein, Pacini Raj and **Heier (1996)** reported that need for cognition thinking style was positively related to GPA of college

students- for men, women and total sample, but faith in intuition was not observed to relate to achievement either for men, women or total group.

May (1997) found in his study those students with left hemispheric style function easily in acquisition of new habit patterns / information.

Sternberg (1997) reported that the legislative style showed significant correlation with the final examinations (0.14) and with an independent project (0.17). The judicial style showed significant correlation with the final exam (0.18) and the independent project (0 15), as well as with quality of homework (0.21). The executive style showed a negative correlation with evaluation of the independent project (0 18).

Sternberg (1997) observed that in public school, in legislative and executive styles both significantly predicted academic achievement (correlation of 0.36 and 0.29), suggesting different subgroup of teachers rewarding different things. The hierarchical style was also significantly related to academic achievement (0.29). In academically oriented private school, significant predictors of achievement were the judicial style (0.56), the liberal style (0.58) and the oligarchic style (0.55). In private school emphasizing emotional education, significant predictors were the legislative style (0.52), the global style (0.42), the liberal style (0.44), the conservative style in the negative direction (-0.38) and the hierarchic style (0.48). In the private Catholic school significant predictors of achievement were the executive style (0.51), the local style (0.39), the liberal style in the negative direction (-0.42), the conservative style (0.49) and the hierarchic style (0.51).

Grigorenko and **Sternberg (1997)** studied the relationship of styles of thinking abilities and academic performance. Participants were high school students, ranging in age from 13 to 16 years. Sternberg and Wagner's Thinking Styles Questionnaire (104 Items) and set of Thinking Styles Tasks for students Sternberg Triarchic Abilities Test and

Academic Performance guide by independent rates were used in the study. The results of the study show that after controlling for levels of abilities, styles of thinking contribute to prediction of academic performance. The correlation pattern suggests that judicial (+), legislative (+) and executive (-) style showed significant associations with academic performance. The relationship was significant in case of former two cases.

Sternberg (1997) investigated whether students do better in classrooms where their styles match rather than mismatch the style of their teachers? It was noted that students performed better and were positively evaluated by the teachers when the student's styles matched rather than mismatched the styles of their teachers. In other words, the students performed better when they were more like their teachers stylistically, independent of actual level of achievement.

Zhang and **Sternberg (1998)** conducted a study to explore the relationship of thinking style abilities, and academic achievement among Hong Kong University students. The data included the participant University entrance examination test scores as well as their self-rated analytical, creative and practical ability levels. The data analysis revealed that the thinking styles that tended to be positively associated with A-level achievement tests were the one that were conservative, hierarchical and internal. But legislative, liberal and external tended to be negatively associated with students academic achievement. It was also noted that global thinking style was significantly and positively associated with academic scores where as the local thinking style was significantly and negatively associated with academic achievement scores. Multiple regression analysis showed that thinking styles served as predictors of academic achievement over and above abilities.

It is apparent that different thinking styles are differentially related to academic achievement of the college and school students.

(SECTION - II)

2.2 LEARNER'S NON-COGNITIVE (PSYCHOLOGICAL) CHACTERISTICS AND THINKING STYLES

2.2.1 Personality and Thinking Styles

Some researchers have explored relationship between personality and thinking styles These have been reviewed here as under :

Mackinnon (1961) observed that the relationship between adapters and innovators on the one hand, and extraversion-introversion on the other hand, is unclear. In a study of male architects reported that those architects judged to be creative by experts in the field also indicated a clear preference for introversion.

Zelniker and Jeffrey (1976) hypothesized that reflective children differ from impulsive children in their information processing strategies. They found that the reflective children used a left hemisphere, analytic-cognitive style and the impulsive children used a right hemispheric, global cognitive style.

Kirton (1976) using his Inventory and Eysenck Personality Inventory, reported that a significant correlation of 0.46 between extraversion and creativity style with two heterogeneous samples from England.

Edward (1979) found that person with left hemispheric style is more rational and person with right hemispheric style is more emotional.

Andrews (1980) reported that anxious persons, bold and frustrated persons are lacking in right / left integrated styles of thinking.

Karne and Kirton (1982) examined the relationship between scores on two inventories (Kirton Adaptation-Innovation Inventory and MBTI) using a heterogeneous sample of 109 management students.

Subjects claimed work experience in a variety of organizations (Industrial, Commercial, Military and Government). Approximately two-third of the subjects was British and remaining one-third represented 14 nationalities.

Analysis of their scores gave significant positive correlations between total Kirton scores and the Myers- Briggs dimensions of intuition, perception and intuition and perception combined Scores on each of the Kirton subscales also correlated significantly with the Myers- Briggs intuition score, perception score and the combined intuition- perception.

Peterson (1983) suggested four distinctive modes of thinking of categories of mental experience derived from knowledge, thus indicating the link between human behaviour and knowledge.

Taggart (1984) concluded that most of the correlations between MBTI personality types and thinking styles were significant.

Karnes (1985) found that there was a significant overlap between hemisphere measures and children's personality Questionnaire's specific variables.

Taggart et al. (1985) noticed that there was negative significant relationship between left hemisphere style of thinking and MBTI intuition personality type.

Heller (1986) cited evidence that extroverted people were found to exhibit significantly more right hemispheric style than both normal and introverted persons.

Sternberg and Grigorenko (1993) reported that correlations were computed with MBTI as well as Gregorc measure of mind styles. For the MBTI 30 out of the 128 correlations were found statistically significant whereas for Gregorc, 22 out of 52 were significant.

Jacobson (1993) studied relationship between styles of creative thinking and personality types among United States service sector

managers and compared to results found among British management students with work experience. Managers in the service sector were more innovative than population in general. Statistically significant positive correlation was found between Kirton's Innovative Style and the Myers.-Briggs intuitive and perceptive dimensions. A statistically significant positive correlation was also found between Kirton's Innovative Style and the Myers-Briggs extraversion and feeling dimensions.

Epstein et al. (1996) studied individual differences in intuitive experimental and analytical-rational thinking styles. The results reported in the study revealed that there was negative significant relationship between analytical thinking style and depression, anxiety and stress in college life. Intuitive style of thinking was also negatively related to anxiety, stream and depression but the magnitude was smaller than former.

Epstein, Pacini, and Denes (1996) reported inverse relation between racist attitudes and analytical styles of thinking.

Saleh (1997) found that majority of participants who were dentified as having right hemispheric style of thinking was intuitive, feeling and perceiving oriented. Most of the participants who were oriented as having left hemispheric style of thinking were sensing, thinking and judging oriented.

Wolfradt (1999) investigated the relationship between thinking style (rational and intuitive), schizotypal traits intolerance of ambiguity, self-efficacy and anomalous experiences. Correlational analysis showed that the anomalous experience were closely related to schizotypal traits and thinking styles. Intuitive thinkers scored highest on interpersonal aspect of schizotypal and interpersonal intolerance of ambiguity.

Sood (2003) reported that students having extrovert and introvert type of personality exhibited significant difference on judicial thinking

style. Extroverts were found to be higher on judicial thinking style than introvert type students. However on 12 thinking styles viz, legislative, executive, monarchic, hierarchical, oligarchic, anarchic, global, local, internal, external, liberal and conservative style. He further found that students in sensing type of personality were higher than intuitive type of students on executive thinking style and intuitive type of students were higher than sensing type of students on monarchic and oligarchic styles. On rest of the thinking styles (10), no significant differences were found between the two groups. Students possessing thinking type of personality were found to score lower an oligarchic and anarchic style than students possessing feeling type personality. Reverse was the case for external thinking style. On this style feeling type personality were found to be superior to students having thinking type of personality. Students having perception type of personality were found superior to students having judgment type personality on judicial style. On rest of the thinking styles, no significant differences emerged.

2.2.2 Locus of Control and Styles of Thinking

Negligible exploration has been made on the association of locus of control and style of thinking.

Borg (1985) reported that co-efficient of correlation indicated insignificant relationship between locus of control and style of thinking.

2.2.3 Self- Esteem and Styles of Thinking

Some research studies have been conducted on the relationship of self-esteem and styles of thinking.

Vingiano (1989) found that students with left hemisphere style viewed themselves in a positive light while right hemisphere style of thinking groups were negative in their perception.

Persinger and Makarec (1991) reported 'that right hemisphere style of thinking displayed the lowest self esteem in both male and female groups. People with greater left hemisphere style characteristic display an elevated sense of self-esteem.

Epstein, Pacini, Denes-Raj and **Heier (1996)** found that analytical rational style of thinking was positively correlated with self-esteem of undergraduate students. Intuitive experimental style of thinking was also related to self-esteem in the same direction but magnitude was smaller.

It may be stated that personality types / traits and other factors like self-esteem and locus of control have been studied in context of styles of thinking. It has been found that thinking style is a manifestation of personality.

2.2.4 Motivation and Styles of Thinking

A little exploration has been done in the relationship between motivation and styles of thinking.

Suresh (1990) concluded that there was significant positive correlation between integrated functioning of hemisphere style and achievement motivation and a significant motivation and a significant negative relationship with anxiety.

Epstein et al. (1996) reported that need for cognition thinking was negatively related to depression anxiety and stress in college life. The correlation with faith in intuition were to the same direction but were in smaller magnitude. Also, in women group, faith in intuition style was not found to be related to depression and stress, it was negatively associated with anxiety.

2.2.5 Adjustment and Styles of Thinking

Negligible amount of research was available on the relationship adjustment and thinking style for example:

Epstein et al. (1996) found that analytical rational style of thinking were both associated with a variety of self report measure of adjustment. Although the two modes of thinking made significant and independent contribution in predicting those variables, the contribution was greater for analytical thinking style.

2.2.6 Leadership Behaviour and Styles of Thinking

Adams (1988) observed that creative thinking style was not related to their leader effectiveness.

Epstein, Pacini, and Denes (1996) reported that analytical rational thinking style was significantly and positively correlated with dominance characteristics of undergraduate students. Correlation of dominance with intuitive direction but magnitude was smaller as compared to analytical style.

2.2.7 Openness to Experience and Styles of Thinking

One study could be traced on the subject cited above :

Raina and Vats (1983) found that openness to inner experience was positively related to right hemisphere style, however, left hemisphere style was not found to be related with openness to experience.

2.2.8 Styles of Learning and Styles of Thinking

Some investigators have made attempts to study the relationship between styles of learning and styles of thinking. Review of such studies has been presented here under:

(Bogen, Fisher and Bogen, 1965, Gozzaniga, 1970 and Spery 1968, Galin, 1971, Duke and Ornstein, 1974) have confirmed what John Hughlings Jackson asserted in 1878 that our brain consists of two distinctive but automatically tasks as reading speaking analytical

reasoning and arithmetic, the right hemisphere is better at spatial tasks, recognizing faces and music.

Dunn et al. (1982) found that student with right hemisphere style indicated strong preferences for an informal setting, music rather than silence, some from oral intake and low light while studying, they also frequent breaks.

Brennan (1984) reported that global / analytic cognitive styles were related to right and left hemisphere style respectively.

Taggart (1984) studied the relationship between style of thinking and learning and reported that right styles thinking dislike structure in learning, independent thinker prefer high intake food and drink. Left thinkers dislike noise and learning in variety of ways, they prefer formal room design.

Bruno (1988) reported that there was statistically significant correspondence between thinking styles (hemisphericity) and learning style preferences specifically for the simultaneous process or there exists a significant correspondence between the elements of requiring sound, needing tactile and kinesthetic materials, intake and mobility when learning and their hemispheric preferences.

Dunn et at. (1990) found that there was significant relationship between students, hemispheric processing preferences and their diagnosed learning styles. Students with right hemisphere style preferred informal sound available, intake accessible environments, and students with left hemispheric preferred than opposite and bright light.

Above mentioned review hints that styles of thinking influence styles of learning of students.

(SECTION - III)

2.3 LEARNER'S NON-COGNITIVE (BACKGROUND) CHARACTERISTICS AND STYLES OF THINKING

Some researchers have explored background variables influence the styles of thinking. The results, however, have been inconclusive. Moreover, research in this perspective has been conducted in Western countries. A little research is traceable which pertains to non-western countries in this context. This section presents the review of studies concerning the association between selected background variables and thinking styles:

2.3.1 Gender and Styles of Thinking

Some research studies have been undertaken on gender differences in styles of thinking. For instance:

Mc. Carthy (1980) reported that both males and females preferred right style. The second choice was left for males and integrated for females.

Mc. Golve (1980) and Levy (1980) found that woman students were superior in left hemispheric style and men in right hemispheric style.

Tan William (1981) and Afloti (1981) reported that both males and females at high school level preferred integrated style and males preferred right hemisphere style.

Gilligan (1982) observed that stereotypes about differences in thinking styles associated with gender are widely held in western society. Rational thinking / logical thinking are associated with masculinity whereas intuitive/ feeling thinking is associated with femininity.

Raina and Vats (1983) observed that females had higher scores in right hemisphere style of thinking in comparison to males but the differences in mean scores was not statistically significant.

Gupta and **Gupta (1984)** found that females tended to have more preference for integrated style and males tended to possess more preference for right hemisphere style at college level.

Stellern et al. (1984) found that elementary females prefer integrated style while men prefer right style of thinking.

Kreshner and **Ledger (1985)** reported that there was no sex difference in thinking styles of primary school children.

Soliman (1989) reported that males scored significantly higher than females on the right hemisphere style. Further males scored significantly higher than females on the left hemisphere style. Also females scored significantly higher than males on the integrated style of thinking.

Habencht et al. (1990) did not find any significant difference in styles of thinking of male and female students.

Manfort (1990) also did not observe any significant difference in the styles of thinking of man and woman students.

Nah Carol (1990) found that right hemispheric preference was associated with female.

Verma (1994) reported that male students had greater inclination toward left hemispheric style than female students.

Epstein et al. (1996) found that rational style was associated with masculinity whereas intuitive feeling style thinking was associated with femininity.

Block and Kremen (1996) reported that women who disconfirm the stereotype of femininity by being very rational or intellectually critical may be subject to problem with interpersonal relation.

Saleh (1997) found significantly gender differences. Men leaned more towards left-brain dominating style than females.

Grigorenko and **Sternberg (1997)** found that student's styles of thinking did not vary across sex variable. Both male and female students had almost similar thinking styles.

Zhang and **Sachs (1997)** reported that men tended to be more globel in their style of thinking than women.

Zhang (1999) conducted a study on thinking styles of university students in Hong Kong. The sex difference did not emerge as significant factor in thinking styles.

Mohan Sundaram and **Kumar (2000)** found that there is association between hemisphericity and sex of students at higher secondary level. Girls are right hemisphere dominated (Boys 28.78%; Girls 71.21%) and boys left hemisphere dominant (Boys 51.26%; Girls 48.73%).

Sood (2000) reported that female students tend to employ external style of thinking more than male students. However, on rest of the 12 styles of thinking viz, legislative, executive, judicial, hierarchical, oligarchic, anarchic, global, local, internal, liberal and conservative no significant differences were found between male and female students.

Verma, Saroj (2001) undertook a study to ascertain the differences in thinking styles of college students based on sex, course type and residential background. Gender differences were observed in some thinking styles. Female students scored significantly higher than male students on legislative and executive style. On the other hand, male students scored significantly higher than female students on monarchic style. On rest of the thinking styles sex differences did not emerge as significant.

Verma, Amila (2001) studied gender difference in thinking styles of senior secondary students. The data were collected through Sternberg's Thinking Style Inventory. Statistical analysis yielded that female students were superior to male students on executive thinking style.

Kumari, Vandana (2004) found that there were no significant differences in thinking styles of male and female postgraduate students of second semester. But in fourth semester students, female were found to be significantly higher on anarchic thinking style.

2.3.2 Age and Styles of Thinking

Grigorenko and Sternberg (1997) also found significant effect on thinking styles.

Sternberg (1997) reported that teachers become more executive, local and conservative with age. Older teachers were found to be higher than younger on above-mentioned styles.

Zhang and Sachs (1997) reported that age factor matters in thinking styles. Older students were significantly more judicial than younger peers.

Zhang (1999) found that participants thinking styles were different by age at university level. Participants who were 33 years old or older scored significantly higher on judicial thinking style than those between 19 and 26 years old. 27 years older scored significantly higher on liberal style and younger scored higher on conservative style. Older also scored higher hierarchical and external styles than younger.

2.3.3 Birth order and Styles of Thinking

Sternberg and Grigorenko (1995) investigated the relationship of birth order and styles of thinking. They found that birth order was related to thinking styles namely legislative, liberal and hierarchical styles being latter born.

Sternberg (1997) reported that latter born siblings tended to be more legislative than earlier born siblings. It is consistent with the past finding that first-born siblings tend to be more accepting of societal dictates than are later born.

Zhang (1999) found that there was no significant difference in thinking styles of university students by birth order

2.3.4 Socio-Economic Status and Styles of Thinking

Sternberg & Grigorenko (1993) and Zhang (1999) did not observe any significant difference in thinking styles of university students based on level of parental education.

Sternberg and **Grigorenko (1995)** found that style of thinking related to two demographic variables - socio-economic status on the basis of parental education and birth order.

Sternberg (1997) reported that socio-economic level related negatively to the judicial, local, conservative and oligarchic styles. In other words students belonging to lower SES were found higher than students belonging to higher SES on above-mentioned styles of thinking. The results are consistent with a notion that greater authoritarianism is found in the individuals of lower socio-economic class.

Socio-economic status (based on father's education) comes to be related to executive style, judicial style and conservative style. It had positive relation with legislative style and hierarchical style. Father's occupational level has also found to be negatively related to judicial, local, conservative and oligarchic styles of thinking

To sum up it may be said that thinking styles of students are influenced by certain background variables. It is also in consonance of theories of styles that they are partly socialized.

2.3.5 Academic Disciplines/Stream and Styles of Thinking

Several investigators made attempts to examine differences in thinking styles of students belonging to different academic majors and disciplines. Some studies have been reviewed in this context in following paragraphs :

Srinivas Iyengar (1974) the best approach to mathematics, physics, chemistry, biology, history, sociology, poetry, music, art is to see them all as petals of the same flower, notes of single piece of music, tints of same apocalyptic rainbow arc, rays that feel the same central illumination.

Kaltsounis (1979) also studied the relationship of hemisphericity to different types of achievement among 103 students in a school for the deaf. Using the Stanford Achievement Test, he found negative correlation with right score for both reading and Comprehension ($r = 0.23$) and mathematics ($r = 0.2$). There was significant positive relationship for the integrated scale scores for reading comprehension ($r = 0.35$), social studies ($r = 0.33$) and science ($r = 0.31$).

Ghosh (1980) in a study of graduate and undergraduate student in a school business and observed that a group of subjects scored significantly lower on the right hemisphere style than the national norms.

Silbey (1980) in a study of graduate and undergraduate students in a school business and observed that a group of subjects scored significantly lower on the right hemisphere style than the national norms.

Schwab expanded Snow's categories to three the investigative (natural science), the appreciative discipline (arts) and the decisive (social science).

Agor (1983) investigated thinking styles of members of American Society of Public Administration and found that dominant thinking style of government managers was intuitive or integrative style.

Lash (1983) found that students of computer programming had left hemisphere style of thinking.

Raina and **Vats (1983)** reported that arts students had greater scores on right hemisphere style of thinking in comparison to science students but the difference in mean scores was not significant.

Coulson and **Strickland (1986)** found significant differences in styles of thinking of chief executive officers and superintendents of schools. Chief executive officers were described as cerebral right thinkers and superintendents as left thinkers.

Taylor (1986) found that student's choice of major was not related to brain dominance.

Grun (1986) observed that certain styles of thinking were found to be associated with specific academic major.

Kienholtz and **Hritzuk (1986)** studied the thinking styles of architecture and medical students who scores were significantly different. The architecture students preferred the idealist thinking style while the medical students favoured the realist thinking style.

Wegston (1989) studied the relationship between creative style and quality of problem definition in MBA students. Also, creative style was studied in relation to type of undergraduate major and years of experience in occupation. Creative style was measured by Kirton Adaptation-Innovation Inventory (KAI). The results showed a statistical significant relationship between creative style and academic major. Nearly twice as many business majors were innovative rather than adopters, with ratios reserved for computer science and accounting majors.

Monfort (1990) reported that students who had chosen major could be differentiated significantly by their scores on thinking styles. Students majoring in accounting, management, finance, computer science, nursing, criminal justice and elementary education scored high on left hemisphere style of thinking. Conversely students who are majoring in interior design, music, journalism, art and architecture had higher scores in right hemisphere style of thinking. Students who scored a right brain thinking style founded to choose major which required spatial / temporal, visualization rather majors which were dependent on language base.

Lavach (1991) reported that humanities subjects depended on a more diffuse and perhaps, divergent thinking style. They exhibited right hemisphere style, whereas natural science subjects appear to prefer a more integrated or left hemispheric style. Social science students exhibited the similar preference for styles of thinking.

Huang and Sisco (1994) reported that students of social science or humanities and of natural science scored as more idealistic than those in engineering. Students of natural science and engineering scored as more analytical than those from social science or humanities, and engineering students scored as more realistic than those of other majors. This group of students preferred the analytical thinking style most and the synthesist style least.

Sternberg and **Grigorenko (1995)** reported a significant effect of disciplines / subjects on thinking styles. Humanities teachers were found more liberal than science teachers were found more local than humanities teachers were.

Saleh (1997) reported that there was significant effect relationship between brain hemispheric styles and academic majors students majoring in business science and engineering fields tended to possess left hemisphere style of thinking whereas students majoring in arts, literature, education, nursing, law communication fields tended to possess right brain dominant style.

Zhang and Sachs (1997) found that students of natural Science and technological subjects had more global thinking style than those in areas of social science and humanities

Mishra (1998) more recently reported that in general students belonging to commerce, management and fine arts mostly prefer right hemisphere style of thinking On contrary, students belonging to arts prefer to use right hemisphere style of thinking. Science students, however, were found to use left and right hemisphere style of thinking.

Sood (2000) in his study of diversity in thinking styles of tertiary students found that science students were significantly higher on legislative, oligarchic and anarchic style than arts students but no significant difference was observed between science and art group of students on executive, judicial, monarchic, hierarchical, global, local, internal, external, liberal and conservative style of thinking. Sood further found that science students were higher on judicial, hierarchical and anarchic styles of thinking as compared to commerce students. While commerce students were higher on monarchic style of thinking. On rest of the thinking styles no significant differences were noticed between science and commerce students. On comparing thinking styles on commerce and art students, no significant differences were found in the thinking styles of the two groups.

Attri (2001) explored styles of thinking of professional students. Sternberg and Wagner's tool of styles of thinking (104 Item inventory) was used. The data analysis reveal that (i) students of engineering, medical, law, BBA and BCA were at par with legislative style, executive style, judicial style, monarchic style, hierarchic style, oligarchic style, anarchic style, global style, local style, internal style, liberal style, and conservative style. However, they showed significant differences on external style of thinking. B.ECI. students were found to be significantly higher on external style than medical, law, BBA and BCA students.

Verma, Saroj (2001) concluded in her study that professional and non-professional students differed on oligarchic, anarchic and local style of thinking. Non-professional students scored significantly higher on oligarchic and anarchic styles whereas professional students on local style.

Verma, Amila (2001) made an inquiry into the impact of stream on thinking styles. The investigation was conducted on or senior

secondary students and styles were measured through Sternberg's Thinking Style Inventory. The data analysis indicated that there was significant effect of stream on some thinking styles. No significant difference emerged in thinking styles of arts and science students except for judicial and internal thinking styles. Science students obtained higher mean score on judicial thinking style whereas arts students score higher on external style of thinking.

Kumari Vandana (2004) observed that in second semester students of major two streams (languages, natural sciences) did not differ significantly on thinking styles except judicial one. In this style, language group was found to be superior to natural science group. Students of natural science group were found to be higher on legislative, executive, global, external and liberal thinking styles. On the other hand, social science group students were found to be higher on hierarchic thinking style. In fourth semester, students of language group showed significantly greater inclination for legislative, judicial, oligarchic, local and executive thinking styles. In comparison to their counterparts social science group. However, on liberal style, social science group exhibited their superiority over language group. The language group also obtained significantly higher scores on legislative, executive, judicial and hierarchic thinking style than natural science group. Social science students scored greater than natural science students on anarchic style of thinking.

It is apparent that academic major differences have been found in certain styles of thinking of the students using different tools of thinking styles. A little research is available on styles of thinking as measured by thinking style inventory by Sternberg.

2.3.6 College Class and Styles of Thinking

Theory of mental self-government also predicts an effect of college class.

Sternberg (1997) reported that in a study of school, teachers were found more legislative but less executive at the lower grades than at the upper grades.

Zhang and Sach (1997) observed that higher-class students (research students) tend to employ external thinking style more than the non-research students do. B. Ed. students were more likely to employ monarchic and local thinking styles than students from higher classes (PC.Ed. and M.Ed. Programme).Further former scored lower on global style than the later.

Zhang (1999) found that the participants of different college class levels did not yield significant differences in thinking styles.

2.3.7 Type of Institution and Styles of Thinking

A few studies could be located on relationship of styles of thinking to type of institution.

Sternberg and Grigorenko (1995) found no significant impact of type school (public school, academically oriented private school and elementary secondary catholic school) on styles of thinking of students.

Sternberg (1997) reported that styles of thinking differed significantly depending upon the type of school where the teachers were serving. The data analysis revealed that with regard to the legislative style the highest mean was shown by the teachers in the private school emphasizing emotional education. The lowest mean was in the public high school.

With regard to the executive style, the highest mean was in the elementary-secondary catholic school. The lowest mean was in the private school emphasizing emotional education. With regard to judicial style, the highest mean was in the academically oriented, prestigious private school. The lowest mean was in the private school emphasizing emotional education.

Sternberg (1997) reported that different school systems rewarded different thinking styles and moreover, that what they rewarded seemed to fit with stylistic character of the schools. For six out of seven planned analyses, it was found that there was significant effect of school ideology on teacher's styles. Either teachers tend to gravitate toward schools that fit them ideologically or else they tend to become like the place they are in.

Zhang (1999) also did not find any significant difference in thinking styles of students in different type of institutions.

There was no association between hemisphericity and type of school (Government and Private).

2.3.8 Grades / Levels of Education and Styles of Thinking

Tagga (1984) asserts that left hemisphere thinking styles predominates the schools and right thinking styles predominates in college.

2.3.9 Race / Culture and Styles of Thinking

Some studies have been reported on the association of race, culture and styles of thinking. For example

Ten Houten et al. (1972) conducted that black students were having significantly more right hemisphere style of thinking than the Caucasian students.

Tsunoda (1978) studied thinking styles of the Japanese and found that their way of thinking is different from that of western people. He described the difference as the 'Japanese Mind' as opposed to the 'Western Mind'.

Torrance and Sato (1979) found significant difference between Japanese and United States students in hemisphere style. They cited evidence from Tsunoda's research that cultures and educational systems influence the way people use their minds.

Tsunoda (cited by Torrance and Sato, 1979) discovered characteristic differences in ways of native Japanese educated in Japan and their counterparts educated in western countries in process of information. Tsunoda also found that second and third generations of Japanese descent born and raised to environment where western languages are spoken such as United States and Brazil, develop exactly the same pattern of left hemisphere functioning style as westerners.

Harrison and Bramson's (1982) studied that the most popular thinking style among their samples of American subjects was the idealist style and the second most popular thinking style was the analyst style.

Hale (1986) had reported the similar findings on the relationship of styles of thinking and race factor.

Chapelle and Roberts (1986) studied cognitive styles of Japanese, Spanish and Arabic Learners of English as Second language. They also noted that the Japanese groups were significantly different from the other groups in their cognitive styles.

Soliman and **Torrance (1986)** conducted research on Japanese, American and Kuwaiti college students learning and thinking styles and observed that the Japanese students preferred an intuitive approach, the Kuwaiti students preferred a logical approach and the American students favoured and integrated approach to problem solving.

Habenicht et al. (1990) found that there was no significant difference in styles of thinking of black and Caucasian children.

Huang (1993) studied the relationship of thinking styles among selected Chinese and North American adult students in higher education. Thinking styles were measured through Harison and Barmson's Thinking Style Inventory. The findings revealed that the relationships were observed between country difference and the pragmatist thinking styles, between major and idealist, analyst and thinking styles. Negative relationships were

noted among several thinking styles. An interaction was found between country difference and the gender difference on the idealist thinking style.

Huang and Sisco (1994) made the comparative study of thinking styles of Chinese and American adult students in higher education, using the Inquiry Mode Questionnaire by Harrison and Bramson. The analysis showed that Chinese students scored as more pragmatic than the American group and the Chinese men and American women scored as more idealistic than the Chinese women and American men.

Bogen (1995) concluded that certain races including Afro-American, Native Americans and Japanese appears more right hemisphere in their style of thinking than Euro-American Caucasian.

Epstein et al. (1996) found that styles of thinking play an important role in interpersonal relationship Intuitive thinking style was positively associated with reported secure relationship with both a current intimate partner and for man only, with a mother. Analytical style, though directly related to rational, non-aggressive tactics for dealing with interpersonal conflicts was associated with having fewer sex partners, a dismissive avoiding relationship style for women and avoidant, insecure models of father.

Verma, Amila (2001) explored the relationship between culture and thinking style in her study on senior secondary students: Thinking styles were assessed through Sternberg's Thinking Style Inventory. The data analysis revealed that there was significant effect of culture on certain thinking styles. Tribal and non-tribal students differed in executive, judicial, local and external style of thinking. The non-tribal students were superior to tribal students in executive, local and external styles of thinking whereas students found to be higher in judicial style than non-tribal students. Interaction between culture and gender was also observed for global style of thinking.

2.3.10 Residence, Locality and Styles of Thinking

Mohan Sundaram and **Kumar (2000)** reported that there is an association between hemisphericity and locality of students. It is inferred that urban students were right hemisphere dominant (Rural – 43.2%, Urban – 56.07%) and rural students were left hemisphere dominant (Rural - 66.40; Urban - 33.79%).

Verma B.P.(1994) concluded that there was no significant difference in thinking styles of rural and urban students.

Zhang and Sachs (1997) observed that students belonging to different residential locations did not show any significant difference in their thinking styles.

Verma, Saroj (2001) concluded that rural students scored significantly higher on thinking hierarchical style and lower on oligarchic style than urban students. On rest styles viz, liberal and conservative no significant differences were discerned.

Sood (2003) reported that tertiary level student belonging to rural and urban areas did not differ on any of the 13 thinking styles measured through Sternberg's Thinking Style Inventory. They were more or less equal on legislative, executive, judicial, monarchic, hierarchical, oligarchic, global, local, internal, external, liberal and conservative styles of thinking.

2.4 A RESUME OF STUDIES

1. Intelligence and Thinking Styles

Kirby and Das (1978), Torrance and Ball (1977), Cody (1983), Mein (1986), Sherwood (1984), Milburn (1984), Kreshner and Ledger 1985), Sternberg and Grigorenko (1993) and Sternberg (1997) explored the relationship of cognitive ability with thinking styles. High, average and low levels of intelligence were found to be significantly related to certain thinking styles.

2. Creativity and Thinking Styles

Wheately (1977), Torrance and Moured (1978,1979), Torrance and Sato (1979), Fiezerald and Hattie (1983), Torrance and Frasier (1983), Milburn (1984), Taggart et.al. (1985), Kershner and Ledger (1985), Goldsmith (1987), Mitchell (1987-88), Al-Sabaty and Gary (1989), Borgret (1990), Kumar, Hoilman and Redegeair (1991), Sumathy (1993), Sternberg and Lubart (1995) studied association between creativity and thinking styles. In majority of the studies right hemispheric style, legislative and liberal styles of thinking were fond to be related with creativity.

3. Artistic Potential, Problem Solving Ability and Thinking Styles

Wagner (1978), Torrance and Frasier (1983), Houtz and Frankel (1988) and Sengultaiah (1989) reported that right and integrative styles of thinking were positive related to artistic ial and left hemispheric style was negatively related to artistic.

4. Academic Achievement and Thinking Styles

Samples (1976), Faddy and Hostler (1979), Mc Brateny (1983), Sinatra (1983), Harnen et.al. (1984), Torrance and Frasler (1983), Brennan (1984), Jarsonbeck (1984), Okabayashi and Toance (1984), Taggart and Torrance (1984), Borg (1985), Holler (1985), Grun (1986), Torrance (1986), Bruno (1988), Roubinek (1989), Kurnmerow (1989), Donna et.aL (1990), Voeltz (1994), Epstien, Pacini and Heier (1996), May (1997), Stemberg (1997) and Zang and Sternberg (1998) studied the relationship of thinking style and academic achievement. In some studies no significant relationships were found between thinking styles and achievement .while in others some styles of thinking were observed to be related positively and negatively with academic achievement.

5. Personality and Thinking Styles

Zelniker and Jettery (1976), Mackinnon (1961), Kirton (1976), Edward (1979), Andrews (1980), Kazne and Kirton (1982), Peterson (1983), Taggart (1984), Karnes (1985), Taggart et.al. (1985), Heller (1986), Sternberg and Grjgorenko (1993), Jacobson (1993), Epstien et al. (1996), Epstein, Pacini, Denes (1996) and Saleh (1997), Walfradt (1999) and Sood (2004) examined the relationship between thinking styles measured through different Thinking Styles Inventories and Personality Inventories Some significant relationships have been observed between personality types and personality types and particular thinking style.

6. Locus of Control and Thinking Styles

Only one study could be located on the association between of control and thinking styles that is of Borg (1985). In this no significant correlations was reported.

7. Self-Esteem and Thinking Styles

A little research has been conducted to investigate that relationship of self-esteem and thinking styles. Vingiano (1989), Persinger and Makarec (1991), Epstien et.al. (1996) paid attention towards this and reported that there was link between hemispheric styles of thinking and self-esteem of the students.

8. Motivation and Thinking Styles

Suresh (1990) and Epstein (1996) found relationship between achievement motivation, anxiety, stress and depression with thinking styles.

9. Adjustment, Leadership, Openness in Experience and Thinking Styles

Thinking styles seemed to shows significant relation with adjustment. (Epstein, et. al., 1996) and openness in experience (Raina and Vats, 1983). Adams (1988) found that thinking styles was not related to

leader effectiveness. However, analytical style had positive significant relationship with dominance characteristics.

10. Styles of Learning and Thinking Styles

Several researchers (Dunn et.al. 1982; Brennan, 1984; Taggart, 1984; Bruno, 1988; Dunn et.al. 1990) have found relationships between styles of learning and styles of thinking.

11. Gender and Thinking Styles

Several researchers found significant difference in thinking styles of male and female students (Mc Glove, 1980; Tanwilliam, 1981; Alloti, 1981; Gilligan, 1982; Gupta, 1984; Stellern et.al. 1984; Soliman, 1984; Nah Carol, 1990; Verma, 1994; Saleh, 1997; Zhang and Sachs, 1997; Mohan Sundram and Kumar, 2000; and Verma, 2001; Verma, 2001; Kumari Vandana, 2001) However, it may be noted this gender difference was noted with regard to few thinking styles. On other measured styles of thinking male and females have been fond alike.

12. Age, Birth Order and Thinking Styles

Grigorenko and Sternberg (1997), Sternberg (1997), Zhang and Sach (1997) and Zhang (1999) observed that age matters in thinking styles.

Sternberg and Grigorenko (1995) and Sternberg (1997) reported significant relations between birth order and thinking styles whereas Zhang (1999) did not report any significant relationship between the two variables.

13. Socio - Economic Status and Thinking Styles

The relationship between the above mentioned two variables was studied by some researchers. Sternberg (1997) found the SES was related to judicial, local, conservation and oligarchic styles. Sternberg and Grigorenko (1995) also supported the relation of SES with some thinking styles. However, Sternberg and Grigorenko (1993) did not observe any relationship between the SES and thinking styles.

14. Academic Stream, Disciplines and Thinking Styles

Kaltsoums (1979), Ghosh (1980), Lash (1983), Grun (1986), Kienholtz and Grun (1986), Kienholtz and Hritzuk (1986), Wegston (1989), Manfort (1990), Lavech (1991), Huang and Siscco (1994), Sternberg and Grigorenko (1995) and Saleh (1997), Zhang and Sachs (1997), Mishra (1998), Sood (2000), Kumari, Vandana (2001) and Verma, Amila (2001) found that some thinking styles across different academic majors, streams and disciplines were found to be different. Attri (2001) also found significant differences in thinking styles of students in certain processional courses. Verma (2001) also reported significant differences in thinking styles of professional and non-professional courses.

15. College Class, Levels of Education and Thinking Styles

Taggart (1984) and Zhang and Sachs (1997) found differences in thinking styles of school and colleges and of lower and upper classes, but Zhang (1999) did not indicate such differences in thinking styles.

16. Type of Institution and Thinking Styles

Sternberg (1997) found institutional differences in thinking styles whereas Sternberg and Grigorenko (1995) and Zhang (1999) did not support the relationship of the two - type of institution and thinking styles.

17. Race, Culture and Thinking Style

Several studies (Ten Houten et.al, 1972; Tsunoda (1978), Torrance and Sato (1979); Harrison and Brarnson (1982); Hale (1986), Chapelle and Roberts (1986), Soliman and Torrance (1986); Huang (1993) and Sisco (1994); Bogen (1995), Epstein et.al. (1986) and Verma (2001) reported impact of culture and race on certain thinking styles.

18. Residence Locality and Thinking Styles

Conflicting results were there with regard to the association of residence locality and thinking styles. Mohan Sundaram and Kumar (2000) and Verma Saroj (2001) reported significant relationship between residence locality of the students and thinking styles while Verma (1994) and Zhang and Sachs (1997) did not find any significant relationship between residence locality and thinking styles.

In View of the above - mentioned resume of research studies it is evident that there is scarcity of the researches on thinking styles of college students with special reference to personality, intrinsic / extrinsic motivation of science / arts / commerce streams. In India, the theme of thinking style is in infancy stage. Therefore, it warrants that researches be conducted in this field in Indian socio-cultural ethos.

The review of related studies provided base for selection of the present study, its hypothesis, methodology, design and statistical analysis of the data.

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CHAPTER – III

RESEARCH DESIGN

CHAPTER - III

RESEARCH DESIGN

3.0 INTRODUCTION

According to **Kerlinger (1973)** research design is the plan, structure and strategy of investigation conceived so as to obtain answers to research questions and to control variance. Therefore, research design is the most vital aspect of any scientific study. Without it, the research work is just like wandering in the bewilderness. Research design makes it possible to plan how the research objectives will be reached and how the problems encountered in the research will be tackled.

The appropriate research design is determined by the nature of the problem under investigation. It includes choice of method of research, defining the population, drawing the sample, nature of variables involved, use of suitable tools for data collection, procedure adopted for data collection and statistical techniques used etc.

The present chapter intends to provide the details of research design followed in the present study.

3.1 METHOD OF RESEARCH

The present study's prime concern was to ascertain the difference sin thinking styles of college students in relation to their cognitive (academic achievement) and non-cognitive characteristics (gender, stream, personality type and motivational orientation). Thus the nature of the study required descriptive analysis of existing thinking styles of college students. For this purpose, neither historical, philosophical, case study nor the experimental research was suitable. Only normative survey under the descriptive research could serves the purpose of the present investigation.

Normative survey method deals with what it is? Its scope is very vast. It describes and interprets what exists at present. In a normative

survey we are concerned with conditions or relationships that exists, practices that prevail, beliefs, points of view or attitudes that are held, processes that are going on, influences that are being felt, and trends that are developing.

Good, C.V. (1963) has pointed out that Descriptive Research Method includes presentation of facts or current conditions concerning the nature of a group of persons, number of subjects or class of events and involves the procedure of induction, analysis, classification, enumeration or measurement.

Thus in view of the objectives of the study, the investigator thought it proper to use ***Normative Survey method*** of research.

3.2 POPULATION OF THE STUDY

According to **Guilford (1965)** A population is a well-defined group of individuals or of observations. In the words of **Best** and **Kahn (1996),** A population is any group of individuals that have one or more characteristics in common that are of interest to the researcher. The population may be all the individuals of a particular type or a more restricted part of that group.

The population of this study included all the students studying in IIIrd year of science, arts and commerce in all the colleges of Jhansi city. It included students of government and aided colleges.

3.3 SAMPLE OF THE STUDY

A sample is small proportion selected for observation and analysis. By observing the characteristics of the sample, one can make certain inferences about the characteristics of the population from which it is drawn.

Samples are not selected haphazardly, they are chosen in a systematic random way, so that chance or the operation of probability can be utilized.

The essential requirement of any sample is that it is representative of the population. **Miller (1977)** states that the scope of generalization of the findings depend on the representativeness of the sample. Infact, good sample is one, which is unbiased and representative of the whole population.

In the present study an attempt was made to select a representative and unbiased sample. The random cluster method technique was employed to draw the sample.

First of all, a list of all colleges of Jhansi was prepared. Then colleges were randomly chosen adopting simple lottery method. Thereafter, one section of science, arts and commerce stream was selected randomly from each selected colleges.

Details of the structure of sample has been given in Table 3.1.

Table 3.1

Structure of the Sample: Stream and Gender wise

S.No	College	Stream			Gender		Total
		Science	Arts	Comm.	Male	Female	
1	Bipin Bihari College, Jhansi	71	26	-	91	6	97
2	Bundelkhand College, Jhansi	42	5	48	68	27	95
3	Shri Guru Hari Krishna Degree College, Jhansi	-	21	18	39	-	39
4	Arya Kanya Degree College, Jhansi	37	27	6	-	70	70
5	Govt. Degree College, Jhansi	43	27	-	-	70	70
Grand Total		**193**	**106**	**72**	**198**	**173**	**371**

It is clear from Table 3.1 that the total sample consisted 371 college students. Out of this 193 belonged to science, 106 belonged to Arts and 72 belonged to Commerce streams. Further, 198 students were male and 173 students were female. Thus the sample was large enough and also representative of the population.

3.4 VARIABLES INVOLVED

In the presented study, two types of variables were considered:

i. Independent and

ii. Criterion variables.

Independent variables are the conditions or characteristics that the experimenter manipulates or controls in his or her attempt to ascertain their relationship to observe phenomena. In the present study one cognitive characteristics - academic achievement and four non-cognitive characteristics namely gender, stream, personality and motivational orientation were the independent variables. These were used for classifications of the subjects.

Criterion variables are those characteristics of the learner on which comparison are made. Under this category sixteen thinking styles were included. Criterion variables are also referred to as dependent variables, which are conditions or characteristics that appear, disappear or change as the experimenter introduces, removes or changes independent variables.

3.5 TOOLS USED

To carry out the investigation, the data is gathered with which hypotheses are tested. Because each data - gathering tool has its own particular weakness or bias, there is need to evaluate them in terms of certain desirable attributes of good tool and finally select the one which seems to be free from major weakness and serve the purpose i.e. generate more adequate data. Reliability, validity, suitability and appropriateness

are studied before any tool is selected out of the available tools. Since selection of suitable tool is of vital importance for successful research.

In the present study the following tools were employed for data collection :

- Your Style of Learning and Thinking (by Torrance et al.)
- Thinking Style Inventory (by Sternberg and Wagner)
- Maudsley Personality Inventory (M P I) (by Eysenck)
- The Student Work Preference Inventory (by Ambile et al.)

In following paragraphs, description of each tool is given.

(1) YOUR STYLE OF LEARNING AND THINKING (FORM B)

For assessing the thinking styles two tools were used. One tool was Your Style of Learning and Thinking (Form B) of Torrance et al. This contains 40 forced items having three choices - One representing a specialized function of left cerebral hemisphere, the second representing a parallel specialized function of the right cerebral hemisphere and the third representing the integrated functioning of both cerebral hemispheres.

Test takers are asked to indicate which of the three styles of thinking or learning best describes their own typical behaviour. "Select the one that describes most accurately your strength of reference."

The reliability coefficient of correlation with the Form 'B' after an investigation of 6 weeks were :

Right = 0.72

Left = 0.74

Integrative = 0.68

A major claim for the validity of these forms of SOLAT is based on research findings concerning the specialized functions of the cerebral hemisphere **(Reynolds, Riegel, Torrance and Ball, 1978)**. It is also based on their styles of processing information and that they will report

them accurately, as is true of almost all self - report instruments. However, a great variety of approaches are being used by the authors and their associates in validating these instruments.

However, before the use of this tool for data collection, its reliability by test- retest method was calculated by following the procedure mentioned below:

First of all a sample of 60 students of B.A., B.Sc. and B.Com. final year was selected randomly from two colleges of Jhansi. They were administered Torrance et al's Your Style of Learning and thinking after explaining the procedure of recording the response and establishing the rapport. After completing the test, scoring was done. Then after 15 days again the same test was administered on the same sample. Second time test was scored out and Pearson's coefficient of correlation was found between the two sets of scores for Left, Right and Integrated styles. The obtained statistics has been displayed in the table 3.2

Table — 3.2

Coefficient of Correlation between YSLT Scores Obtained on First and Second Administration (N = 60, Interval= Two Weeks)

Test Administration	Coefficient of Correlation (r)
1st Administration and 2nd Administration of the YSLT	Left Style = 0.71 Right Style = 0.70 Integrative Style = 0.67

The obtained coefficients of correlation on Indian college's students for the three styles are approximately the same.

Here the test was considered reliable for using in the study. A copy of Your Style of Learning and Thinking is given in Appendix – A-1 and data of test-retest reliability in Appendix - B.

(2) THINKING STYLE INVENTORY

Thinking styles inventory by **Sternberg** and **Wagner (1992)** was also used to assess the thinking style of college students. It is a self - reporting test consisting of 104 items. The inventory has 13 scales with 8 items on each scale.

For each item, the respondents are asked to rate themselves on a 7-point scale anchored by 1, which indicates that the statement does not characterize them at all, and 7, which indicates that the statement characterize them extremely well. These 13 scales 1 correspond to the 13 thinking styles described in Sternberg's styles are Legislative, Executive, Judicial, Monarchic, Hierarchic, Oligarchic, Anarchic, Internal, External, Global, Local, Liberal and Conservative.

Sternberg and **Wagner (1992)** collected norms for various age groups on the long version of the TSI. For their college sample, scale reliabilities ranged from 0.42 (Monarchic) to 0.88 (External), with a medium reliability of 0.78.

According to **Sternberg (1997),** the 13 scales of the thinking styles Inventory was found to have internal - consistency reliability ranging from 0.57 to 0.88 with a median of 0.82. Only one reliability was in the 0.50s, two were in the 0.60s, and one was in the 0.70s and rest were in the 0.80s.

One thing is worthwhile to be recorded here that instead of 7-point, the investigator used 5-point rating for this inventory and an attempt was made by the investigator to determine the reliability of Thinking Style Inventory (of Sternberg by test-retest method) on sample of 60 Indian college students selected through random method with an interval of two weeks. The obtained results have been shown in table 3.3.

Table - 3.3

Test Retest Reliability of Sternberg's Styles of Thinking - inventory on Indian College Students (N = 60, Interval=2 weeks)

S.No.	Name of Styles	Coefficients of Correlation
1	Legislative	0.68
2	Executive	0.76
3	Judicial	0.77
4	Monarchic	0.75
5	Hierarchic	0.76
6	Oligarchic	0.75
7	Anarchic	0.80
8	Internal	0.79
9	External	0.77
10	Global	0.80
11	Local	0.78
12	Liberal	0.60
13	Conservative	0.65

The obtained coefficients of correlation were quite satisfactory. Hence the tool was considered suitable for the use in the present study.

A copy of the Thinking Style Inventory is given in the Appendix – A-2 and data of test-retest reliability in Appendix - B.

(3) MAUDSLEY PERSONALITY INVENTORY (M P I)

The Maudsley Personality Inventory is a brief but standard as well as an easily scored inventory. It is designed for assessing Neuroticism - Stability and Introversion - Extroversion dimensions of personality. It is considered suitable for normal and abnormal adults and

also for adolescents. The inventory can be used in group or with an individual. The vocabulary required is that of the average newspaper. Although the time limit is enforced in testing, but the short scale takes about 3 to 5 minutes, while the long scale takes about 15 to 20 minutes. The items from serial number 1 to 12 given on the front page of the test booklet make the short scale, while all 48 items of the booklet constitute the long scale. Each of these items is answerable by making a tick-mark into one of the three boxes and marked with instruction to answer the questions are given on the front cover page of the test booklet.

The reliability- coefficient by comparing the first half with the 2nd half, yielded for N = +0.567 and E = ±0.358. When corrected to full length, these figures became for N = 0.73 and E = 0.68. These figures are lower than the English data, but are likely that an odd / even reliability would be in any case higher figures than would be a comparison of the first half versus second half.

However, it may be mentioned here that original inventory had reliability coefficients for Neuroticism (ranging between 0.85 and 0.90) and for Extroversion (ranging between 0.75 and 0.85) calculated on many sample by split-half and Kuder-Richardson's method.

For estimating validity the full scale was administered on postgraduate male and female students. For the full scales the mean neuroticism score for the male and female groups combined was 232 with a SD of 10.0, this corresponds with English norms of 19.9 and SD 11.0. For Extraversion scale the mean combined score was 27.8 and SD 6.2, this compares with English Norms of 24.9, SD 9.7. There were no difference of any significance between males and females and the data suggest that the Indian group was slightly more neurotic and extroverted than the English Standardization group. Findings with the short scale are similarly showing the comparable values of means and SDs.

The test is scored with the help of standard key. Test-retest reliability was also ascertained by the investigator on a sample of 60 college students (drawn randomly) with an interval of 2 weeks. The obtained results are shown in table 3.4.

Table - 3.4

Test-Retest Reliability of MPI on Indian College Students

(N = 60, Interval = 2 weeks)

Dimension	Coefficient of Correlation
Extraversion	0.68
Neuroticism	0.73

The obtained coefficients of correlations were found comparable to the coefficients of correlation got by Eysenck. Hence this inventory was considered appropriate to be used in the study.

A Copy of the MPI is given in Appendix – A-3 and data obtained for test-retest reliability in Appendix - B.

(4) THE WORK PREFERENCE INVENTORY. Teresa M. Ambile (1987)

The Work Preference Inventory (WPI) is designed to assess individual differences in intrinsic and extrinsic motivational. orientations. There are two versions of it. One is meant for college student's and another for working adults. Both versions aim to capture the major elements of intrinsic motivation (self-determination), competence, task involvement, curiosity, enjoyment and interest) and extrinsic motivation (concerns with competitions, evaluation, recognition, money or other tangible incentives and constraint by others).

The final version of college students Work Preference Inventory has 30 items, 15 for intrinsic motivation and 15 for extrinsic motivation. The items have been written in the first person. The respondents are asked to indicate the

extent to which each item describes them on a 4-point scale, from 1 = never or almost never of me to 4 = always or almost always true of me.

The instrument is scored on two primary scales - intrinsic motivation and extrinsic motivation and each sub divided into two subscales.

Test-retest reliability (6 months, n = 18) was found to be 0.84 and 0.94 for intrinsic and extrinsic motivation respectively. Cronbach's reliability was also quite satisfactory 0.79 and 0.78 for intrinsic and extrinsic motivation scales.

Scale norms were also developed for college students, men and women students.

Relationship between two scales was essentially orthogonal. For students, the intrinsic and extrinsic primary scales correlated -0.21.

Further WPI scores were found to be related in meaningful ways to other questionnaire and behavioural measure of motivation, as well as personal characteristics, attitudes and behaviours.

Test-retest reliability of the Work Preference Inventory was also ascertained by the investigator. On a sample of 60 college students (drawn randomly) with an interval of two weeks, the following coefficients of correlation were obtained as reported in table 3.5.

Table - 3.5

Test-retest Reliability of The Work Preference Inventory

(N =60, interval = 2 weeks)

Variable	Coefficient of Correlation
Intrinsic Motivation	0.69
Extrinsic Motivation	0.71

The obtained coefficients of correlations were somewhat lower as compared to original one obtained by the authors of the inventory. But values were high and were indicative of the facts that inventory could be used in the Indian context.

A copy of the Work Preference Inventory is given in Appendix – A-4 and the obtained data of test-retest reliability in Appendix - B.

3.6 DATA COLLECTION

For data collection, first of all class teachers of concerned colleges were contacted by the investigator and schedule of test administration was decided. Thereafter, selected tools were administered on the subjects in two phases. In the first phase the following tools were administered:

- Your Style of Thinking and Learning (Torrance et al) and
- Thinking Style Inventory (Sternberg and Wagner)

In the second phase, tools mentioned below were administered:

- Maudsley Personality Inventory (M P I) and
- The Student Work Preference Inventory (by Ambile)

However, before administration of the tests, students were told the purpose of the study and importance of their cooperation in data collection. After putting them into proper frame of mind, tests were distributed according to schedule. The obtained data have been given in Appendix – C.

3.7 CLASSIFICATION OF SUBJECTS

Subjects were classified on extraversion, neuroticism, extrinsic motivation and intrinsic motivation variables. M ± 1SD formula was applied on scores of each variable. Subjects scoring M + 1SD or above were identified as having high level and subjects scoring M – 1SD or

below were identified as having low level. For instance on extraversion dimension, subjects scoring M + 1SD and above were classified as high extraversion (extroverts) and those who scored M – 1SD and below were classified as low extraversion (introverts). Similarly subjects scoring M + 1SD and above on neuroticism dimensions were classified as high neuroticism (neurotic) and those scored M – 1SD and below on neuroticism dimension were classified as low neuroticism (stable).

High and low levels of extrinsic motivation and intrinsic motivation were also identified in the same manner.

3.8 STATISTICAL TECHNIQUES USED

Statistics is a body of mathematical techniques or processing for gathering organizing, analyzing and interpreting numerical data. Because most research yields such quantitative data, statistics is a basic tool of measurement, evaluation and research.

As the focus in the present study was to ascertain the significant differences in mean scores of thinking style (s) of college students in relation to achievement, gender, stream, personality type and motivational orientation, two statistical techniques namely one-way analysis of variance and 't' tests were performed depending upon the comparison of three and two groups. In case of comparison three groups, One-way-ANOVA was used and in case of comparison of two groups, 't' test was employed. In case of significant 'F' also 't' test was used to pin point the exact source of difference in three means.

3.8.1 One-Way-Analysis of Variance

In single classification, or one-way-analysis of variance, the relationship between one independent and one dependent variance is examined.

This technique involves three operations mentioned below:

1. The variance of the scores for three groups are combined into one composite group, known as the total groups variance (V_t).
2. The mean value of the variances of each of the three groups, computed separately, is known as the within groups variance (V_w)
3. The difference between the total groups variance and the within groups variance is known as the between groups variance ($V_t - V_w = V_b$).
4. The F ratio is computed.

$$F = V_b / V_w$$

$$= \text{Between-groups variance} \ / \ \text{Within-groups variance}$$

The Logic of the 'F'-Ratio :

The logic of F-ratio is as follows -

The within - groups variance represents the sampling error as the error variance or residual. The between-groups variance represents the influence of the variable of interest or the experimental variable. If the between-groups variance is not substantially greater than the within-groups variance, the research would conclude that the difference between the means is probably only a reflection of sampling error. If the 'F' ratio were substantially greater than one, it would seem that the ratio of the between-groups variance was probably too great to attribute to sampling error.

The critical values of the 'F'-ratio (named for Sir Ronald Fisher) are found in an F-table, which indicates the critical values necessary to test the null hypothesis at selected levels of significance (in education conventionally 0.05 and 0.01 levels). The 'F'-ratio is seen against the two different degrees of freedom, one for V_b (the numerator) and the one for V_w, (the denominator).

In the mathematical development of the analysis of variance a number of assumptions have been made. According to Ferguson (1981) the following assumptions may be specially noted:

1. The distribution of dependent variable in the population from which samples are drawn is assumed to be normal.
2. Another assumption made in its use is that the variances in the population from which the samples are drawn, are equal. This is known as homogeneity of variance.
3. The effects of various factors on the total variation are additive, as distinct from, say, multiplicative.

Thus, the basic model underlying the analysis of variance is that a given may be partitioned into independent and additive bits, each bit resulting an identifiable source. In most situations there are no ground rules to suspect the validity of this model.

Several statisticians held that if the sample is large enough and has been drawn randomly with all care, there is no need to test the basic assumptions of ANOVA before it's applying to the data.

In the present study One-way-ANOVA was employed without any testing of its assumptions because first of all institutions were selected randomly. Secondly, sample was drawn by random cluster method. Thirdly, the size of the sample was large enough.

Post-hoc analysis in case of significant 'F' was done by 't' test, so that exact source of mean differences may be ascertained.

3.8.2 The 't' test of Independent Samples

The test of significance of the difference between two means is known as a 't' test. It involves the computation of the ratio between experimental variance (observed difference between the two sample means) and error variance (the sampling error factor).

The obtained value of 't' was evaluated at 0.05 and 0.01 level of significance. If the 't' value was equal or exceeded the table value of for the particular degree of freedom and level of significance the difference between the two means was considered significant at that level (0.05 or 0.01). If the obtained 't' value was not found significant at even 0.05 level of significance, the difference between the two means was treated as false and attributable to chance factor or sampling fluctuations.

In addition to the above-mentioned statistics, graphs were also used to depict the difference in means.

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CHAPTER – IV

ANALYSIS AND INTERPRETATION OF THE DATA

ANALYSIS AND INTERPRETATION OF THE DATA

4.0 INTRODUCTION

The purpose of the study was to ascertain the differences in thinking styles of college students on account of their certain cognitive and non-cognitive characteristics. Academic achievement was taken as cognitive characteristic. Gender, stream, personality type and motivational orientation were taken as non-cognitive characteristics. The relevant data were collected with the help of suitable tools and official records. After scoring and organizing data, analysis and interpretation of data were made in consonance with objectives and hypotheses of the study.

In the present chapter, an attempt has been made to give elaborate description of the analysis and interpretation of the data in a systematic manner.

4.1 THINKING STYLES IN RELATION TO ACADEMIC ACHIEVEMENT

TESTING HYPOTHESIS – 1

There will be significant differences in thinking styles of college students having high, average and low levels of academic achievement.

Sixteen thinking styles of college students are to be compared for different achievement groups. The hypothesis has been sub-divided into sixteen sub hypotheses. Each sub hypothesis has been analyzed by One-way-ANOVA. In case of significant 'F' ratio, 't' tests have also been applied to detect the source of significance in different pairs of mean scores.

HYPOTHESIS – 1.1

There will be significant differences in Left Hemispheric Style of thinking of college students having high, average and low levels of academic achievement.

The information of the results of One-way-ANOVA, which has applied to test the above hypothesis, have been supplied in table 4.1.

Table 4.1 Summary of One-way ANOVA for the scores of Left Hemispheric style in respect of Achievement Groups

Source of Variance	df	SS	MS	F-Ratio
Between Group	2	50.375	25.187	2.488
Within Group	368	3724.671	10.121	NS
Total	370	3775.045		

NS = Not Significant at 0.05 level

It may be noted from table 4.1 that the F-ratio was found to be 2.488, which is non significant statistically ($p > 0.05$ df = 2 and 368). It implies that there was no significant differences in mean scores of left hemispheric style of college students having high, average and low academic achievement. Hence the research hypothesis 1.1 stands rejected.

HYPOTHESIS – 1.2

There will be significant differences in Right Hemispheric style of thinking of college students having high, average and low levels of academic achievement.

To test this hypothesis, one-way analysis of variance was applied. The results for the same have been reported in table 4.2.

Table 4.2 Summary of One-way ANOVA for the scores of Right Hemispheric style in respect of Achievement Groups.

Source of Variance	df	SS	MS	F-Ratio
Between Group	2	107.579	53.789	3.614*
Within Group	368	5477.956	14.885	
Total	370	5585.536		

* Significant at 0.05 level

Table 4.2 exhibits that the observed F-ratio was obtained as 3.614, which is significant at 0.05 level. It means that students having high, average and low academic achievement differed significantly on right hemispheric thinking style. Hence the research hypothesis 1.2 was accepted.

Since the 'F' ratio gives the overall picture of the results and does not specify the exact source of mean difference 't' test was performed. The observed results have been shown in table 4.3.

Table 4.3 Significance of Difference in Mean Scores of Right Hemispheric style of Thinking in respect of High Achievers, Average Achievers and Low Achiever Students

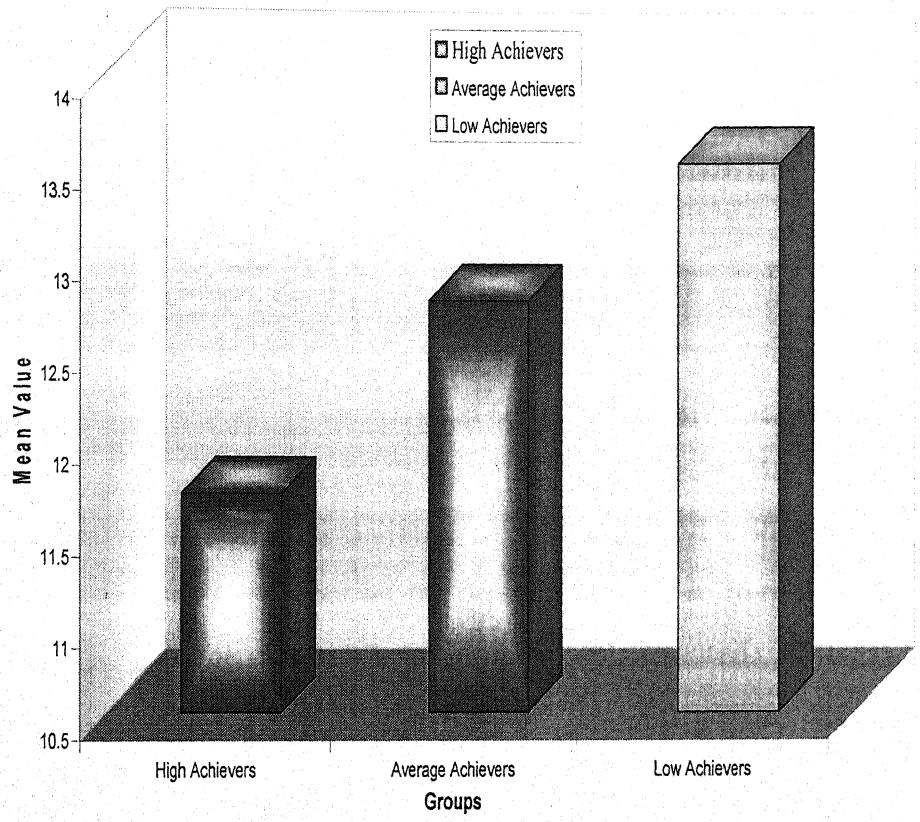
S. No.	Achievement Group	N	M	S.D.	Comparison Group	't' value
1.	High	69	11.7	4.25	1 and 2	1.872 NS
2.	Average	246	12.76	3.81	1 and 3	2.606*
3.	Low	56	13.52	3.57	2 and 3	1.420 NS

NS = Not Significant at 0.05 level * Significant at 0.05 level

It is evident from table 4.3 that 't' value has come out to be 2.606 for comparison of means of right hemispheric style of high and low achievers. It is significant at 0.05 level. Furthermore table 4.3 discloses that mean score of low achievers is greater than high achievers. ($M = 13.52 > M = 11.7$). Hence it may be concluded that low achievers are significantly higher on right hemispheric thinking style than their counterparts - high achievers.

Table 4.3 also indicates that the 't' value 1.872 for the comparison of high and average achievers was not found significant even at 0.05 level of significance. It leads to the conclusion that high and average achievers did not differ significantly on right hemispheric style.

Fig 4.1 Significance of Diffrence in Mean Scores of Right Hemispheric style of Thinking of High Achievers, Average Achievers and Low Achiever Students



It is also clear from the table that the 't' value 1.420 obtained for the comparison of average and low achievers was insignificant ($p > 0.05$) which leads us to the conclusion that there is no statistically significant difference between average and low achievers on right style of thinking. In other words both average and low achievers are alike on this style of thinking.

HYPOTHESIS – 1.3

There will be significant difference in Integrated Hemispheric style of thinking of college students having high, average and low academic achievement.

One-way ANOVA was used to test this hypothesis. The summary of results of which have been supplied in table 4.4.

Table 4.4 Summary of One-way ANOVA for the scores of Integrated style in respect of Achievement Groups.

Source of Variance	df	SS	MS	F-Ratio
Between Group	2	1.412	0.706	0.033
Within Group	368	7850.199	21.332	NS
Total	370	7851.611		

NS = Not Significant at 0.05 level

Table 4.4 exhibits that 'F' value for integrated style was obtained to be 0.033, which is insignificant at 0.05 level. It implies that there was no significant difference among the students of three achievement groups viz; high, average and low on integrated thinking style. Stating otherwise, achievement has no impact on the integrated style of thinking of college students. Hence the research hypothesis 1.3 was rejected.

HYPOTHESIS – 1.4

There will be significant difference in Legislative Style of thinking of college students having high, average and low academic achievement.

For testing this hypothesis, one-way analysis of variance was employed to the scores of legislative style. The summary of the results in this regard have been given in table 4.5.

Table 4.5 Summary of One-way ANOVA for the scores of Legislative style in respect of Achievement Groups.

Source of Variance	df	SS	MS	F-Ratio
Between Group	2	27.868	13.934	0.303
Within Group	368	16944.600	46.045	NS
Total	370	16972.469		

NS = Not Significant at 0.05 level

It may be seen in table 4.5 that F-ratio was found to be 0.303, which is not significant ($p > 0.05$, df = 2 and 368). It mean that there was no significant difference in mean scores of legislative thinking style of college students having high, average and low academic achievement. Hence the research hypothesis 1.4 was rejected.

HYPOTHESIS – 1.5

There will be significant differences in Executive Style of thinking of college students having high, average and low academic achievement.

To test this hypothesis, one-way analysis of variance was applied on the scores of executive style. The details of this statistics is provided in table 4.6.

Table 4.6 Summary of One-way ANOVA for the scores of Executive style in respect of Achievement Groups.

Source of Variance	df	SS	MS	F-Ratio
Between Group	2	64.390	32.195	0.674
Within Group	368	17565.938	47.733	NS
Total	370	17630.329		

NS = Not Significant at 0.05 level

It is clear from table 4.6 that the observed F-ratio 0.674 was not significant at 0.05 level with df =2 and 368. It shows that there was no significant difference among students having high, average and low achievement. Hence the research hypothesis anticipating that there will be significant differences in executive style of thinking of college students having high, average and low academic achievement was rejected.

HYPOTHESIS – 1.6

There will be significant differences in Judicial Style of thinking of college students having high, average and low academic achievement.

In order to test the above hypothesis, One-way ANOVA was computed. The results obtained from this have been reported in table 4.7.

Table 4.7 Summary of One-way ANOVA for the scores of Judicial Style in respect of Achievement Groups.

Source of Variance	df	SS	MS	F-Ratio
Between Group	2	60.846	30.422	0.776
Within Group	368	14432.852	39.219	NS
Total	370	14493.698		

NS = Not Significant at 0.05 level

Table 4.7 shows that the F-ratio for judicial thinking style was obtained as 0.776, which was not significant ($p > 0.05$) with df = 2 and 368. It means that there was no significant difference in the mean scores of judicial style of thinking in respect of the three achievement groups, i.e. high, average and low. Hence the research hypothesis 1.6 was rejected.

HYPOTHESIS – 1.7

There will be significant difference in Monarchic Style of thinking of college students having high, average and low academic achievement.

The results of the One-way ANOVA statistical technique have been given in table 4.8.

Table 4.8 Summary of One-way ANOVA for the scores of Monarchic Style in respect of Achievement Groups.

Source of Variance	df	SS	MS	F-Ratio
Between Group	2	92.530	46.265	0.749
Within Group	368	22715.879	61.728	NS
Total	370	22808.409		

NS = Not Significant at 0.05 level

Table 4.8 indicates that the F-ratio for monarchic style came out to be 0.749, which was below the tested F- value to be significant. Hence rejecting the research hypothesis 1.7, which stated that there will be significant difference in monarchic style of thinking of college students having high, average and low achievement. In other words all the three groups possessing high, average and low academic achievement behave almost equally on this thinking style.

HYPOTHESIS – 1.8

There will be significant differences in Hierarchic Style of thinking of college students having high, average and low academic achievement.

The summary of One-way ANOVA with regard to testing of this hypothesis is given in table 4.9.

Table 4.9 Summary of One-way ANOVA for the scores of Hierarchic style in respect of Achievement Groups.

Source of Variance	df	SS	MS	F-Ratio
Between Group	2	93.041	46.520	0.817
Within Group	368	20951.628	56.933	NS
Total	370	21044.668		

NS = Not Significant at 0.05 level

Table 4.9 reveals that the 'F'-ratio obtained for hierarchic thinking style was 0.817. It is not significant at 0.05 level of significance ($p > 0.05$, with df =2 and 368). It leads us to conclude that students having high, average and low academic achievement did not differ significantly with respect to hierarchic style of thinking. In other words, the hierarchic style of thinking does not affect significantly the students having high, average and low academic achievement. Hence research hypothesis 1.8 was rejected.

HYPOTHESIS – 1.9

There will be significant differences in Oligarchic Style of thinking of college students having high, average and low academic achievement.

The results of One-way analysis of variance have been presented in table 4.10.

Table 4.10 Summary of One-way ANOVA for the scores of Oligarchic style in respect of Achievement Groups.

Source of Variance	df	SS	MS	F-Ratio
Between Group	2	49.354	26.677	0.569
Within Group	368	15964.823	43.383	NS
Total	370	16014.178		

NS = Not Significant at 0.05 level

Table 4.10 exhibits that 'F'-ratio for oligarchic style was obtained as 0.569, which was insignificant at 0.05 level of significance ($p > 0.05$, df = 2 and 368). It implies that there was no significant difference among the high, average and low academic achievers, with reference to their oligarchic style thinking In other words, achievement has no significant influence on the oligarchic style of thinking of college students. Hence the research hypothesis stating that there will be significant differences in Oligarchic style of thinking of college students having high, average and low academic achievement was rejected.

HYPOTHESIS – 1.10

There will be significant differences in anarchic style of thinking of college students having high, average and low academic achievement.

Table 4.11 shows the value.

Table 4.11 Summary of One-way ANOVA for the scores of Anarchic Style in respect of Achievement Groups

Source of Variance	df	SS	MS	F-Ratio
Between Group	2	60.637	30.318	0.551
Within Group	368	20259.907	55.054	NS
Total	370	20320.545		

NS = Not Significant at 0.05 level

It may be observed from the table 4.11 that F-ratio (0.551) obtained for anarchic style of thinking is too small to become significant at 0.05 level. This implies that students having high, average and low academic achievement were alike with regard to their anarchic thinking style. Hence the research hypothesis which states that there will be significant difference in anarchic style of thinking of college students having high, average and low academic achievement was rejected.

HYPOTHESIS – 1.11

There will be significant differences in Global Style of thinking of college students having high, average and low academic achievement.

The summary obtained of one way analysis of variance computed for testing the above-mentioned hypothesis is given in table 4.12.

Table 4.12 Summary of One-way ANOVA for the scores of Global style in respect of Achievement Groups.

Source of Variance	df	SS	MS	F-Ratio
Between Group	2	4.501	2.250	0.046
Within Group	368	17815.002	48.410	NS
Total	370	17819.504		

NS = Not Significant at 0.05 level

Table 4.12 shows that the F-ratio for global style was obtained as 0.046, which is not significant at 0.05 level because it remained less than the table value of F with df 2 and 368. It may be inferred that there was no significant difference in the mean scores of global style of thinking in respect of three achievement groups i.e. high, average and low achievement groups. They were more or less equal on global style of thinking. Hence the research hypothesis 1.11 was rejected.

HYPOTHESIS – 1.12

There will be significant differences in Local Style of thinking of college students having high, average and low academic achievement.

Table 4.13 provides details of statistical results applied for testing the hypothesis.

Table 4.13 Summary of One-way ANOVA for the scores of Local style in respect of Achievement Groups.

Source of Variance	df	SS	MS	F-Ratio
Between Group	2	326.120	163.059	3.432 *
Within Group	368	17484.021	47.511	
Total	370	17810.140		

* Significant at 0.05 level

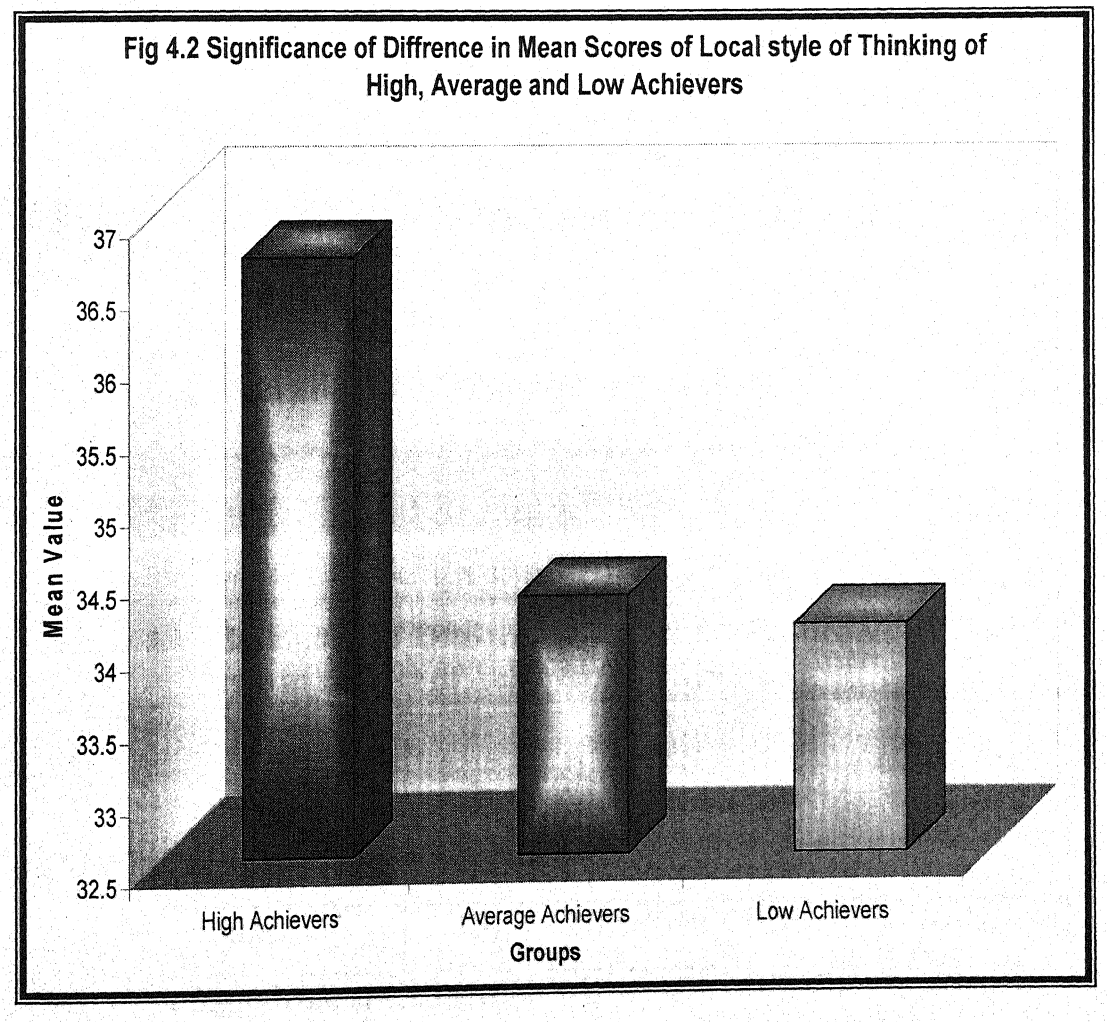
It is evident from table 4.13 that the 'F'- value was obtained to be 3.432 which is significant at 0.05 level of significance ($p < 0.05$, with df = 2 and 368). It suggest that students having high, average and low academic achievement differed significantly with reference to local style of thinking in respect of college students. Hence the research hypothesis stating that there will be significant difference in local style of thinking of college students having high, average and low academic achievement was accepted.

In order to find out the exact source of significance in mean scores of three groups 't' tests were performed on the local style of thinking. The observed results have been reported in table 4.14.

Table 4.14 Significance of Difference in Mean Scores of Local Style of Thinking in respect of High Achievers, Average Achievers and Low Achiever Students.

S. No.	Achievement Group	N	M	S.D.	Comparison Group	't' value
1.	High	69	36.67	6.67	1 and 2	2.595**
2.	Average	246	34.30	6.83	1 and 3	2.019*
3.	Low	56	34.09	7.44	2 and 3	0.370 NS

NS=Not Significant at .05 level * Significant at .05 level **Significant at .01 level



It is clear from the table 4.14 that the 't' value of 2.595 was found significant at 0.01 level. It compares the mean scores of local style of high and average achievers. Since the mean score of high achievement group (M = 36.67) was greater than the mean score of average achievement group (M = 34.30). It may be concluded that high achieving students were significantly higher on local style of thinking than average achieving students.

Table 4.14 also indicates that the 't' value 2.019 was also significant at 0.05 level which compares the mean scores of local thinking style of high achieving and low achieving students. It thus leads to the conclusion that students having high achievement differed significantly from students having low academic achievement on local thinking style. Hence the research hypothesis 1.12 was accepted.

In view of the above, it may be said that high achievement group was higher on local style than the low achievement group.

The third t-ratio was however non-significant statistically ($p > 0.05$, df = 2 and 368) ($t = 0.370$) which implies that there was no statistical difference between average achievement group and low achievement group on local style of thinking.

HYPOTHESIS – 1.13

There will be significant difference in Internal Style of thinking of college students having high, average and low academic achievement.

For testing this hypothesis, one-way analysis of variance was employed to the scores of internal style. The detail of results is shown in table 4.15.

Table 4.15 Summary of One-way ANOVA for the scores of Internal style in respect of Achievement Groups.

Source of Variance	df	SS	MS	F-Ratio
Between Group	2	70.694	35.347	0.538 NS
Within Group	368	24185.904	65.723	
Total	370	24256.598		

NS = Not Significant at 0.05 level

The 'F' value as exhibited from the table for internal style of thinking was obtained as 0.538 which is insignificant at 0.05 level ($p > 0.05$, df = 2 and 368). It means that the students having high, average and low academic achievement did not differ significantly with reference to their internal style of thinking. Hence the research 1.13 was rejected.

HYPOTHESIS – 1.14

There will be significant difference in External Style of thinking of college students having high, average and low academic achievement.

Table 4.16 Summary of One-way ANOVA for the scores of External style in respect of Achievement Groups.

Source of Variance	df	SS	MS	F-Ratio
Between Group	2	19.406	9.7031	0.130
Within Group	368	27508.519	74.7513	NS
Total	370	27527.924		

NS = Not Significant at 0.05 level

It is apparent from the table that the 'F' value was found to be 0.130 which was not significant ($p > 0.05$, df = 2 and 368) thereby rejecting the hypothesis 1.14. It thus leads to the conclusion that there will be no significant difference in external thinking style of students with high, average and low academic achievement

HYPOTHESIS – 1.15

There will be significant differences in Liberal Style of thinking of college students having high, average and low academic achievement.

Table 4.17 exhibits the obtained F- test results in this regard.

Table 4.17 Summary of One-way ANOVA for the scores of Liberal Style in respect of Achievement Groups.

Source of Variance	df	SS	MS	F-Ratio
Between Group	2	103.476	51.738	0.759
Within Group	368	25098.540	68.202	NS
Total	370	25202.01617		

NS = Not Significant at 0.05 level

The observed 'F'-ratio 0.759 as seen in table 4.17 was non-significant at 0.05 level of significance ($p > 0.05$, df = 2 and 368). It leads us to interpret that there was no significant difference in students having high, average and low academic achievement with respect to liberal style of thinking. Hence the research hypothesis stating that there will be significant difference in Liberal style of thinking of college students having high, average and low academic achievement was not accepted.

HYPOTHESIS – 1.16

There will be significant difference in Conservative Style of thinking of college students having high, average and low academic achievement.

For testing this hypothesis, One-way ANOVA statistical technique was employed to the scores of conservative style. The summary of the results have been shown in table 4.18.

Table 4.18 Summary of One-way ANOVA for the scores of Conservative style in respect of Achievement Groups.

Source of Variance	df	SS	MS	F-Ratio
Between Group	2	7.206	3.603	0.063
Within Group	368	20963.528	56.966	NS
Total	370	20970.73		

NS = Not Significant at 0.05 level

The obtained results as shown in the table 4.18 indicates that the F-ratio 0.063 was not significant at 0.05 level of significance ($p > 0.05$, df = 2 and 368). It implies that there was no significant difference between college students having high, average and low academic achievement on conservative style of thinking. In other words, achievement has no impact on the conservative style of thinking. Hence the research hypothesis stating that there will be significant difference in conservative style of thinking of college students having high, average and low academic achievement was rejected.

4.2 THINKING STYLES IN RELATION TO GENDER

TESTING HYPOTHESIS - 2

Hypothesis 2 states that "**there will be significant differences in thinking styles of male and female college students".**

Since there are sixteen dimensions that have been considered as a parameter for comparing male and female students. Thus this hypothesis includes sixteen sub hypotheses, each of which has been tested by using 't' test of significance.

HYPOTHESIS – 2.1

There will be significant difference between male and female college students with regard to their Left Hemispheric Style of thinking.

To test this hypothesis, t-test of significance has been employed. The values in this context have been shown in table 4.19.

Table 4.19 Significance of Difference Between mean scores of Left Hemispheric Style In respect of Male and Female students

Group	N	Mean	S.D.	df	't' value	Significance
Male	198	13.90	3.24	369	0.181	NS
Female	173	13.84	3.15			

NS = Not significant at 0.05 level.

It is evident from the above table 4.19 that 't'-value for Left Hemispheric Style of thinking of male and female students have come out to be 0.181 which is insignificant at both levels of confidence, this leads to mean that both male and female students do not differ significantly with regard to left hemispheric style of thinking. However, the analysis of mean values Male = 13.90, Female = 13.84 favours left style for males, it may therefore be concluded that male and female students are equally oriented in left style.

HYPOTHESIS – 2.2

There will be significant difference between male and female college students with regard to their Right Hemispheric Style of thinking.

't'-test of significance has been used to test this hypothesis, the values in this context have been shown in table 4.20.

Table 4.20 Significance of Difference between mean scores of Right Hemispheric Style in respect of Male and Female students

Group	N	Mean	S.D.	df	't' value	Significance
Male	198	12.85	3.94	369	0.941	NS
Female	173	12.47	3.83			

NS = Not significant at 0.05 level.

Table 4.20 reveals that 't'-value for Right Hemispheric Style of thinking of male and female students is 0.941, which is insignificant at both levels of confidence. It may thus be interpreted that there exists no significant difference between male and female students with regard to right hemispheric style of thinking. It is also illustrated by the analysis of mean (M= 12.85, F = 12.47) that the mean value is higher in favour of male. Therefore it may be generalized that both male and female are equally oriented in right hemispheric style of thinking.

HYPOTHESIS – 2.3

There will be significant difference between male and female college students with respect to their Integrated Style of thinking.

t-value in this regard has been given in table 4.21.

Table 4.21 Significance of Difference between mean scores of Integrated Style in respect of Male and Female students

Group	N	Mean	S.D.	df	't' value	Significance
Male	198	13.84	4.66	369	1.507	NS
Female	173	14.56	4.53			

NS = Not significant at 0.05 level.

Table 4.21 depicts that 't'-value for Integrated Hemispheric style of thinking of male and female students have come out to be 1.507 which is insignificant at both levels of confidence, meaning thereby that both male and female students do not differ significantly with regard to integrated hemispheric style of thinking. It may be shown on the basis of analysis of mean values that the mean value for females (M=14.56) is higher than the mean value for male (M=13.84). This leads to the conclusion that both male and female students use integrated style of thinking equally.

HYPOTHESIS – 2.4

There will be significant difference in Legislative Style of thinking of male and female college students.

This hypothesis has been tested by the use of t-test of significance, the values in this regard has been shown in table 4.22.

Table 4.22 Significance of difference Between mean scores of Legislative Style in respect of Male and Female students

Group	N	Mean	S.D.	df	't' value	Significance
Male	198	40.85	7.12	369	1.431	NS
Female	173	41.85	6.34			

NS = Not significant at 0.05 level.

As demonstrated by table 4.22, 't'-value for legislative style has come out to be 1.431, which is not significant at any level of confidence, meaning thereby, that there is no significant difference between male and female students on legislative style of thinking. The table also depicts that mean value for legislative style of female students (M = 41.85) is higher than the mean value for male students (M = 40.85), but the difference could not found to be significant. Hence leading to generalization that both male and female college students are similar on legislative style of thinking.

HYPOTHESIS – 2.5

There will be significant difference in Executive Style of thinking between male and female college students.

To test this hypothesis, t-test of significance has been employed. The values in this regard have been shown in table 4.23.

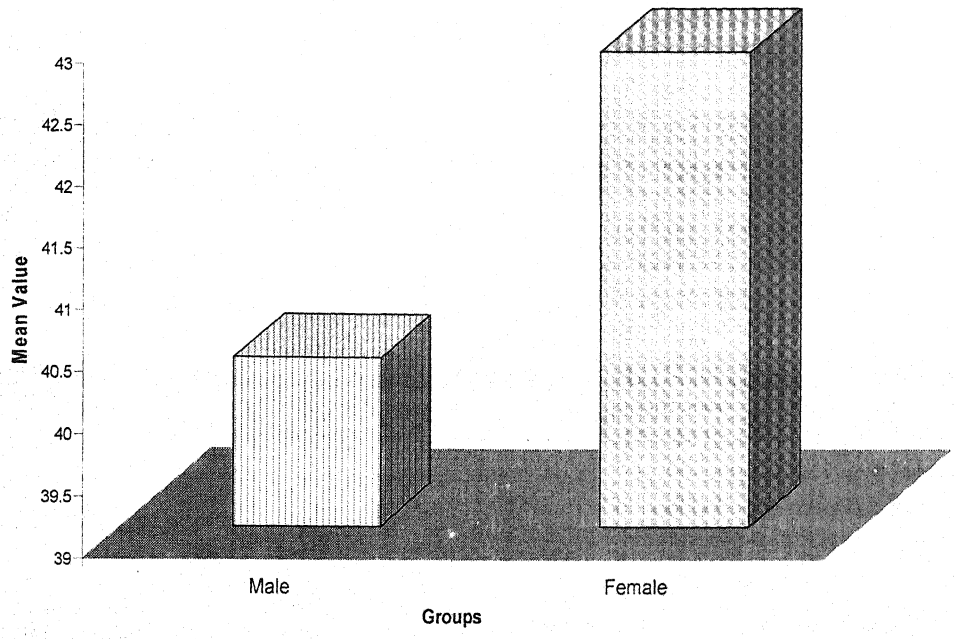
Table 4.23 Significance of difference between mean scores of Executive Style in respect of Male and Female students

Group	N	Mean	S.D.	df	't' value	Significance
Male	198	40.36	6.76	369	3.56	**
Female	173	42.88	6.84			

** Significant at 0.01 level.

As the above table 4.23 demonstrates, 't'-value for executive style of thinking has come out to be *3.56,* which is significant at .01 level of probability. Thus it may be inferred with 99 percent of confidence that there is a significant difference between male and female students on executive style. Further it may be shown from the analysis of mean values that mean value for female (M = 42. 88) is higher than mean value for male (M = 40.36) students respectively. Hence it leads to a generalization that females are more dominant with regard to executive style in comparison to male students.

Fig 4.3 Significance of difference between mean scores of Executive Style in respect of Male and Female students



HYPOTHESIS – 2.6

There will be significant difference between male and female college students with regard to their Judicial Style of thinking.

Values regarding t-test for this hypothesis have been illustrated in table 4.24.

Table 4.24 Significance of Difference Between mean scores of Judicial Style in respect of Male and Female students

Group	N	Mean	S.D.	df	't' value	Significance
Male	198	38.17	6.68	369	0.248	NS
Female	173	38.01	5.76			

NS = Not Significant at 0.05 level.

As the above table 4.24 reads, 't'-value has come out to be 0.248 which is insignificant at both the levels of confidence, thus rejecting the hypothesis. It may thus be described that there does not exists any significant difference between male and female students on judicial style

as perceived. Also the analysis of mean values indicates that the mean value for males (M = 38.17) is higher than the mean value for females (M = 38.01). However it may be concluded that both male and female students are equally good in their judicial style of thinking.

HYPOTHESIS – 2.7

There will be significant difference between male and female college students with respect to their Monarchic Style of thinking.

't'-value regarding the above hypothesis have been indicated in table 4.25.

Table 4.25 Significance of Difference Between mean scores of Monarchic Style in respect of Male and Female students

Group	N	Mean	S.D.	df	't' value	Significance
Male	198	34.31	7.96	369	1.785	NS
Female	173	32.86	7.67			

NS = Not Significant at 0.05 level.

It is clear from the above table 4.25 that t-value for monarchic style has come out to be 1.785, which is insignificant at both levels of significance, thereby conclude that there is no significant difference between male and female students on monarchic style of thinking. It is also evident from the analysis of mean values of male (M = 34.31) and female (M = 32.86) that mean value is higher in favour of male students, but it could not lead to a significant difference. Thus it may be concluded that both male and female students are equal in monarchic style.

HYPOTHESIS – 2.8

There will be significant difference between male and female college students with regard to their Hierarchic Style of thinking.

To test this hypothesis, t-test of significance has been used, which is demonstrated in table 4.26.

Table 4.26 Significance of Difference Between mean scores of Hierarchic Style in respect of Male and Female students

Group	N	Mean	S.D.	df	't' value	Significance
Male	198	42.17	8.09	369	1.264	NS
Female	173	43.15	6.84			

NS = Not Significant at 0.05 level.

Table 4.26 reveals that the 't'-value for hierarchic style of thinking has come out to be 1.264, which is insignificant at both levels of significance, thus rejecting the null hypothesis that there is significant difference between male and female students with regard to hierarchic style of thinking. Analysis of mean values illustrates that mean value for female (M = 43.15) is higher than that for male (M = 42.17). Hence it may be generalized that male and female students are equally inclined towards hierarchic style of thinking.

HYPOTHESIS – 2.9

There will be significant difference between male and female college students on their Oligarchic Style of thinking.

't' value have been shown in the table 4.27 to test this hypothesis.

Table 4.27 Significance of Difference Between mean scores of Oligarchic Style in respect of Male and Female students

Group	N	Mean	S.D.	df	't' value	Significance
Male	198	31.71	6.69	369	1.136	NS
Female	173	32.48	6.10			

NS = Not Significant at 0.05 level.

It is apparent from the table 4.27 that 't'-value for oligarchic style come out to be 1.136, which is insignificant at both levels of confidence, which means that there is no significant difference in oligarchic style of

thinking of male and female students. Further the above table also show that female students has higher mean value (M=32.48) than male students (M = 31.71), but not to the extent to lead to a significant difference. Thus it leads to an inference that both male and female students are equally oriented in oligarchic style of thinking.

HYPOTHESIS – 2.10

There will be significant difference between male and female students with regard to their Anarchic Style of thinking.

This hypothesis has been tested by the use of t-test of significance, which is shown in the table 4.28.

Table 4.28 Significance of Difference Between mean scores of Anarchic Style in respect of Male and Female students

Group	N	Mean	S.D.	df	't' value	Significance
Male	198	35.12	7.61	369	0.768	NS
Female	173	35.71	7.18			

NS = Not Significant at 0.05 level.

Table 4.28 reveals that t-value for anarchic style of thinking has come out to be 0.768, which is not significant at any level of significance thus rejecting the null hypothesis. It may further be explained that there is no significant difference between male and female students with respect to anarchic style of thinking. Further, the mean value analysis described that the mean value for females (M = 35.71) is higher than the mean value for males (M = 35.12) but it not lead to significant difference. Therefore, it may be inferred that both male and female students are similar on anarchic style of thinking.

HYPOTHESIS – 2.11

There will be significant difference between male and female students with regard to their Global Style of thinking.

Values regarding this hypothesis have been given in table 4.29

Table 4.29 Significance of Difference Between mean scores of Global Style in respect of Male and Female students

Group	N	Mean	S.D.	df	't' value	Significance
Male	198	33.82	6.66	369	0.784	NS
Female	173	33.25	7.26			

NS = Not Significant at 0.05 level.

Above table 4.29 indicates that t-value in case of global style of thinking has come out to be 0.784, which is not significant at both levels of confidence. It may thus be interpreted that there is no significant difference in global style of thinking of male and female students. Mean values from the above table reveals that mean value for males is higher than the mean value of females, which are 33.82 and 33.25 respectively. It may therefore be concluded that both male and female students are equally good in global style of thinking.

HYPOTHESIS – 2.12

There will be significant difference between male and female students with regard to their Local Style of thinking.

't'-test of significance has been used to test this hypothesis. Values for the same gas been given in table 4.30.

Table 4.30 Significance of Difference Between mean scores of Local Style In respect of Male and Female students

Group	N	Mean	S.D.	df	't' value	Significance
Male	198	34.97	6.99	369	0.762	NS
Female	173	34.42	6.89			

NS = Not Significant at 0.05 level.

It is demonstrated by the above table 4.30 that t'-value in case of local Style of thinking has come out to be 0.762, which is insignificant

thereby rejecting the hypothesis. This implies that there is no significant difference with regard to local style of thinking of male and female students. However, it is clear from the mean value analysis that mean value is higher in favour of males which is 34.97. It may hence be generalized that male and female students does not differ in local style of thinking.

HYPOTHESIS – 2.13

There will be significant difference between male and female college students with regard to their Internal Style of thinking.

Values regarding this has been given in table 4.31.

Table 4.31 Significance of Difference Between mean scores of Internal Style In respect of Male and Female students

Group	N	Mean	S.D.	df	't' value	Significance
Male	198	35.9	8.27	369	1.804	NS
Female	173	34.99	7.88			

NS = Not Significant at 0.05 level.

The above table 4.31 demonstrates that 't'-value for internal style of thinking has come out to be 1.084, which is insignificant at both levels. It implies that there is no significant difference between male and female students with respect to internal style of thinking. However, the mean value analysis reveals that mean value is higher in favour of males, which is 35.9. It may thus be concluded that male and female students are equally oriented in their internal style of thinking.

HYPOTHESIS – 2.14

There will be significant difference between male and female college students with regard to their External Style of thinking.

t-value have been shown in the table 4.32 to test this hypothesis.

Table 4.32 Significance of Difference Between mean scores of External Style in respect of Male and Female students

Group	N	Mean	S.D.	df	't' value	Significance
Male	198	38.76	8.71	369	1.882	NS
Female	173	40.44	8.46			

NS = Not Significant at 0.05 level.

It is revealed from table 4.32 that 't'-value for external style of thinking has come out to be 1.882, which is not significant at both levels of confidence, hence rejecting the hypothesis. It may thus be interpreted that there is no significant difference in global style of thinking of male and female students with regard to external style of thinking. Mean value analysis depicts that the mean value for females (M = 40.44) is higher than that of males (M = 38.76), thereby meaning that both male and female students are equally good in external style of thinking.

HYPOTHESIS – 2.15

There will be significant difference between male and female college Students with regard to their Liberal Style of thinking.

This hypothesis has been tested by t- test. The values regarding 't'-test for this hypothesis have been shown in table 4.33.

Table 4.33 Significance of Difference Between mean scores of Liberal Style in respect of Male and Female students

Group	N	Mean	S.D.	df	't' value	Significance
Male	198	40.89	8.75	369	1.424	NS
Female	173	42.10	7.62			

NS = Not Significant at 0.05 level.

It is apparent from the above table 4.33 that 't'-value in case of liberal style of thinking has come out to be 1.424, which is insignificant at both levels of confidence. It means that there is no significant difference between male and female students with regard of liberal style of thinking. It is also clear from the above table that the mean values is higher in favour of females, which is 42.10, but not to the extent to make a significant difference. Therefore, it leads to the generalization that the male and female students are similar in liberal style of thinking.

HYPOTHESIS – 2.16

There will be significant difference between male and female college students with regard to their Conservative Style of thinking.

Values in this regard has been given in table 4.34.

Table 4.34 Significance of Difference Between mean scores of Conservative Style In respect of Male and Female students

Group	N	Mean	S.D.	df	't' value	Significance
Male	198	31.69	7.65	369	0.498	NS
Female	173	31.30	7.40			

NS = Not Significant at 0.05 level.

It is apparent from the above table 4.34 that 't'-value in case of conservative style of thinking has come out to be 0.498, which is insignificant at both levels of significance. Thus it may be interpreted that there is no significant difference between male and female students on conservative style of thinking as perceived. It is also demonstrated from the above table that the mean values for males (M= 31.69) is higher than that for females (M= 31.30), but not to the extent to make a significant difference. Therefore, it leads to conclude that both male and female students are equally oriented towards conservative style of thinking.

Tables 4.19 to 4.34 thus reveal that 1 out of the 16 't'-values was found to be significant and remaining were found to be insignificant. 't'value was found significant for Executive Style of thinking (p = 0.01). For rest of the thinking styles viz. Left, Right, Integrated, Legislative, Judicial, Monarchic, Hierarchic, Oligarchic, Anarchic, Global, Local, Internal, External, Liberal and Conservative under male and female students does not show any significant differentiation. It may further be concluded that male students are more Executive Style oriented than females in thinking.

4.3 THINKING STYLES IN RELATION TO STREAM

TESTING HYPOTHESIS - 3

There will be significant differences in thinking styles of college students belonging to science, arts and commerce streams.

Since sixteen styles of thinking of college students are to be compared for different streams, the present hypothesis includes sixteen sub hypotheses. Each sub hypothesis has been tested by one-way analysis of variance. In case of significant 'F' ratios, 't' tests have also been applied.

HYPOTHESIS – 3.1

There will be significant differences in Left Hemispheric Style of thinking of college students belonging to science, arts and commerce streams.

To test this hypothesis, one-way-analysis of variance was applied. The obtained results have been shown in table 4.35

Table 4.35 Summary of One-way ANOVA for the scores of Left Hemispheric style in respect of Stream Groups.

Source of Variance	df	SS	MS	F-Ratio
Between Group	2	179.000	89.500	9.159 **
Within Group	368	3596.045	9.772	
Total	370	3775.045		

** Significant at 0.01 level

Table 4.35 exhibits that the F-ratio was obtained as 9.159, which is highly significant ($p < 0.01$, df 2 and 368). This implies that college students belonging to science, arts and commerce stream differed significantly on left hemispheric style of thinking. Hence the research hypothesis 3.1 was accepted.

Since the 'F' ratio gives the global picture of the results and does not specify exact loci of mean difference, 't' tests were performed. The obtained results have been shown in table 4.36.

Table 4.36 Significance of Difference in Mean Scores of Left Hemispheric Style of Thinking in respect of Science, Arts and Commerce Students

S. No.	Stream	N	M	S.D.	Comparison Group	't' value
1.	Science	193	14.54	3.13	1 and 2	3.486**
2.	Arts	106	13.21	3.17	1 and 3	3.457**
3.	Commerce	72	13.07	3.06	2 and 3	0.295 NS

NS = Not Significant at 0.05 level ** Significant at 0.05 level

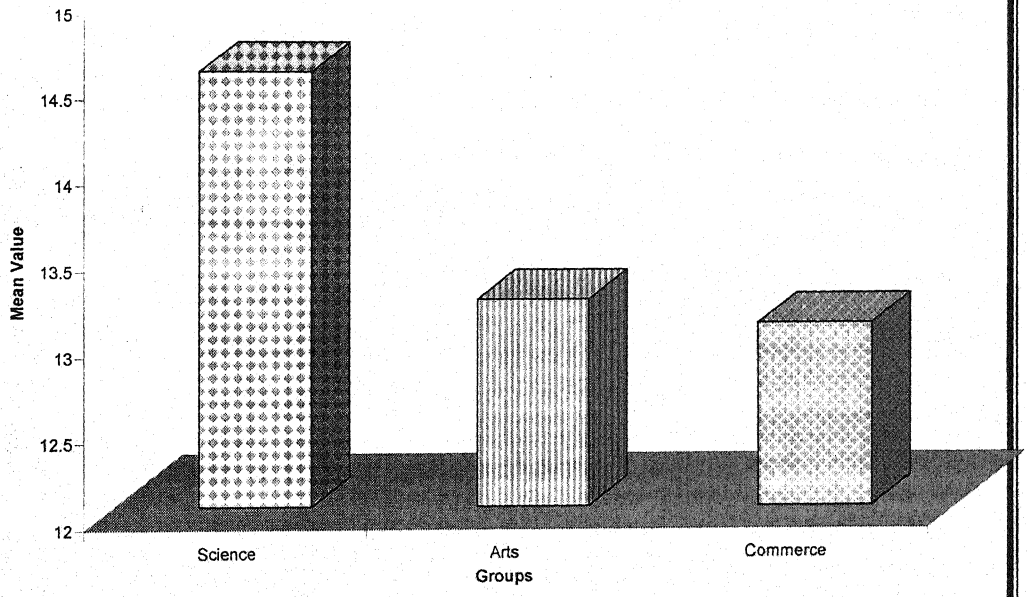
It is evident from the table 4.36 that 't'-value has come out to be 3.486 for comparison of means of left hemispheric style of science and arts students. This 't' value is significant at 0.01 level of significance. Further, table 4.36 discloses that mean value for science group is higher than arts group ($M = 14.54 > M = 13.21$), from this it may be concluded that science students were significantly higher on left hemispheric thinking style than their counterparts ie. arts students.

Table 4.36 indicates that t-ratio (3.457) comparing mean of left hemispheric style of science and commerce students were found to be highly significant ($p<0.01$, df 297). This suggests that there is a significant difference between science and commerce students on left hemispheric style. Because mean difference is in favour of science group ($M=14.54 >$

M=13.07). It may be said that science students were significantly higher on left hemispheric style of thinking than commerce students.

It may also be noted that 't' ratio (0.295), which compares arts and commerce groups on left hemispheric style was not found significant even at 0.05 level of significance. It leads to the inference that arts and commerce students did not differ significantly on left hemispheric style. It means that arts and commerce students were alike on left hemispheric style of thinking.

Fig 4.4 Significance of Difference in Mean Scores of Left Hemispheric Style of Thinking in respect of Science, Arts and Commerce Students



HYPOTHESIS – 3.2

There will be significant difference in Right Hemispheric Style of thinking of college students belonging to science, arts and commerce streams.

In order to test this hypothesis, one-way analysis of variance was employed. The obtained results of this analysis have been provided in table 4.37.

Table 4.37 Summary of One-way ANOVA for the scores of Right Hemispheric style in respect of Stream Groups.

Source of Variance	df	SS	MS	F-Ratio
Between Group	2	244.091	122.045	8.039 **
Within Group	368	5351.445	14.542	
Total	370	5595.536		

** Significant at 0.01 level

It is apparent from the above table 4.37 that F-ratio in case of right hemispheric style has come out to be 8.039, which is significant at 0.01 level of confidence. This means that there was significant difference in right hemispheric style of thinking of college students belonging to science, arts and commerce streams. Hence research hypothesis 3.2 was accepted.

For specifying the exact source of difference in means of right hemispheric style, 't'-tests were performed. The obtained results have been shown in table 4.38.

Table 4.38 Significance of Difference in Mean Scores of Right Hemispheric Style of Thinking in respect of Science, Arts and Commerce Students

S. No.	Stream	N	M	S.D.	Comparison Group	't' value
1.	Science	193	12.08	3.62	1 and 2	4.398**
2.	Arts	106	13.94	3.43	1 and 3	0.502 NS
3.	Commerce	72	12.39	4.75	2 and 3	2.379*

NS = Not Significant at 0.05 level ** Significant at 0.01 level

* Significant at 0.05 level

Table 4.38 reveals that 't'-ratio (4.398) came out to be significant at 0.01 level ($p < 0.01$, $df = 197$). This compares right hemispheric style of science and arts students. From the obtained results it may be inferred that science and arts differed significantly on right hemispheric style. Since the

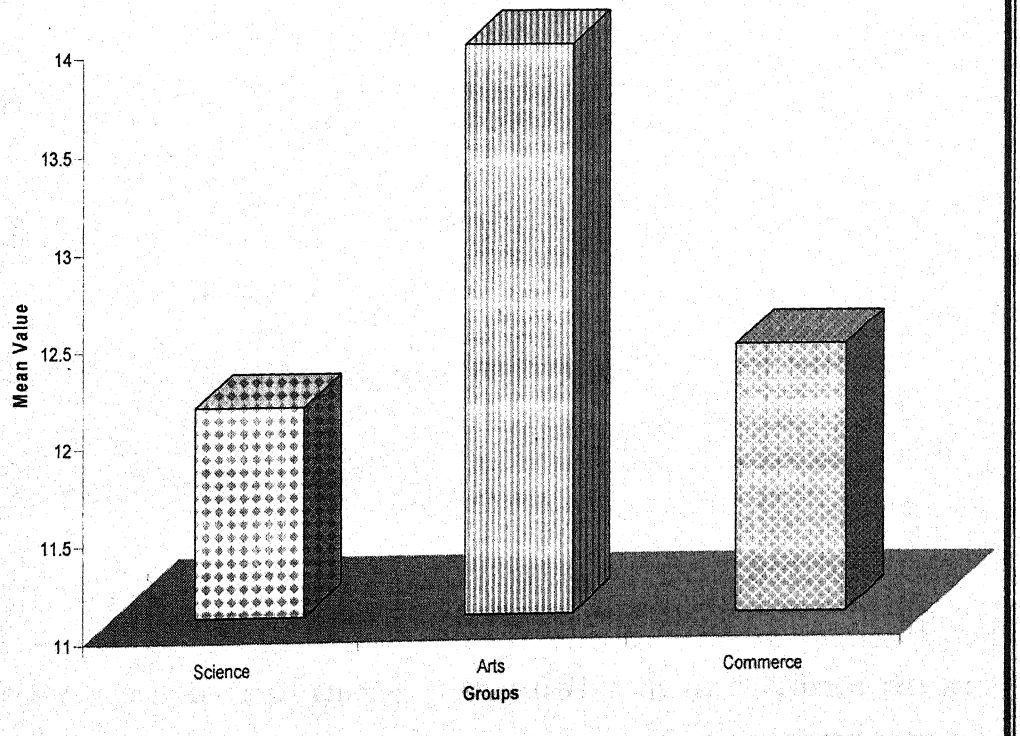
mean value of arts group (M = 13.94) is greater the mean value of science group (M = 12.08), it may be concluded that arts students were significantly higher on right hemispheric style of thinking than science students.

Table 4.38 further reveals that another 't' - value (0.502), which compares science and commerce students, was found to be non-significant (p> 0.05). It implies that there was no significant difference in right hemispheric thinking style of science and commerce students.

The third 't'-value (2.379) comparing arts and commerce students on right hemispheric style came out to be significant at 0.05 level. Since the mean difference is in favour of arts group (M = 13.94), it may be said that students of arts were significantly more right hemispherical style oriented than students of commerce group.

Thus students of arts group were significantly higher on right hemispheric thinking style than students of science and commerce groups.

Fig 4.5 Significance of Difference in Mean Scores of Right Hemispheric Style of Thinking in respect of Science, Arts and Commerce Students



HYPOTHESIS – 3.3

There will be significant difference in Integrated Hemispheric Style of thinking of college students belonging to science, arts and Commerce streams.

The hypothesis was tested by one-way analysis of variance, the results of which are given in table 4.39.

Table 4.39 Summary of One-way ANOVA for the scores of Integrated Hemispheric style in respect of stream groups.

Source of Variance	df	SS	MS	F-Ratio
Between Group	2	53.502	26.751	1.262 NS
Within Group	368	7798.109	21.190	
Total	370	7851.612		

NS = Not Significant at 0.05 level

It may be seen in table 4.39 that 'F' - ratio was obtained as 1.262 which is not significant ($p > 0.05$, df = 2 and 368). It means that there was no significant difference, it mean scores of integrated hemispheric style of college students belonging to science, arts and commerce students are equal. Hence the research hypothesis 3.3 was rejected.

HYPOTHESIS – 3.4

There will be significant difference in Legislative Style of thinking of college students belonging to science, arts and commerce stream.

For testing this hypothesis, one-way analysis was applied on these scores of legislative style; the summary of which is given in Table 4.40.

It is clear from the table 4.40 that the obtained 'F'-ratio of 4.293 is significant at 0.01 level with df = 2 and 368. It shows that there were significant differences among the students belonging to science, arts and

Table 4.40 Summary of One-way ANOVA for the scores of Legislative style in respect of stream groups

Source of Variance	df	SS	MS	F-Ratio
Between Group	2	386.954	193.477	4.293*
Within Group	368	16585.515	45.069	
Total	370	16972.469		

* Significant at 0.01 level

commerce streams. Hence the research hypothesis anticipating significant differences in legislative style of thinking in respect of students belonging to three streams was accepted. Since F-test does not specify the exact source of differences in mean scores, t-tests was performed. The summary in this regard has been given table 4.41

Table 4.41 Significance of Difference in Mean Scores of Legislative Style of Thinking in respect of Science, Arts and Commerce Students

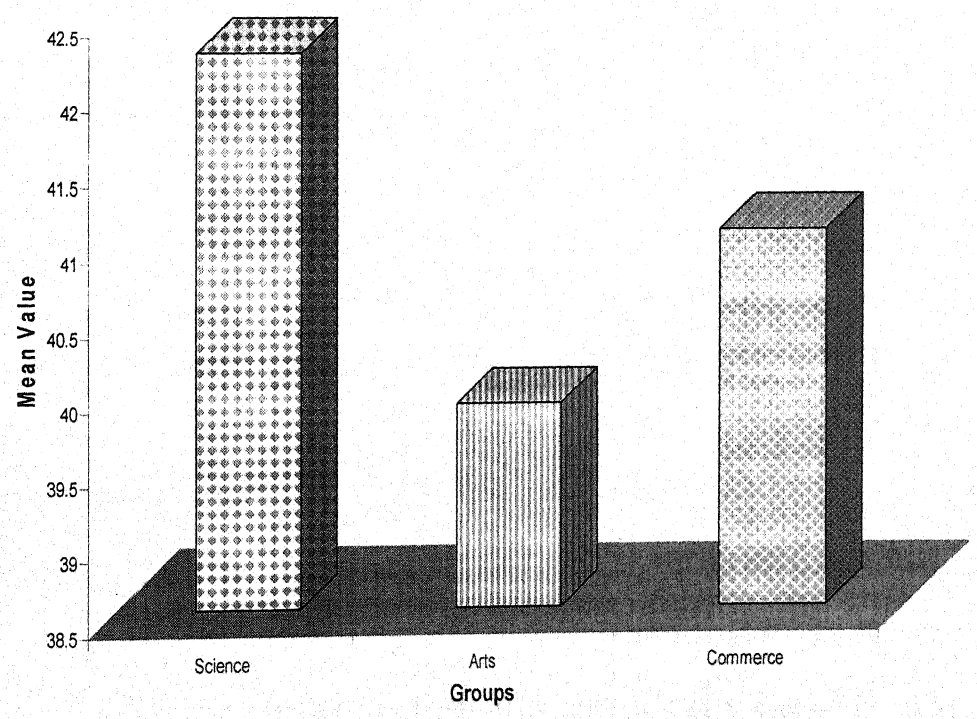
S. No.	Stream	N	M	S.D.	Comparison Group	't' value
1.	Science	193	42.22	6.77	1 and 2	3.069**
2.	Arts	106	39.87	6.08	1 and 3	1.191 NS
3.	Commerce	72	41.03	7.4	2 and 3	1.101 NS

NS = Not Significant at 0.05 level ** Significant at 0.01 level

Table 4.41 discloses that 'F'-ratio of 3.069 comparing arts and science group came out to be highly significant ($p < 0.01$, $df = 297$). It implies that students belonging to science and arts stream differed significantly with regard to legislative style of thinking. Since mean scores of science group (M= 42.22) were greater than the mean score of arts (M= 39.87), it may be said that science students are more tended towards legislative style of thinking as compared to arts students.

Another 't'-value (1.191) comparing science and commerce group came out to be insignificant ($p > 0.05$, $df = 263$). It implies that there was no significant difference between science and commerce students on legislative style of thinking. Similarly the 't' value comparing arts and commerce students on legislative style came out to be 1.101, which is not significant even at 0.05 level of confidence. It leads to the conclusion that there was no difference between arts and commerce students with regard to legislative style of thinking. In other words, arts and commerce students were almost equal on legislative style of thinking and the obvious difference in the two means was due to chance factor or sampling fluctuations.

Fig 4.6 Significance of Difference in Mean Scores of Legislative Style of Thinking in respect of Science, Arts and Commerce Students



HYPOTHESIS – 3.5

There will be significant difference in Executive Style of thinking of college students belonging to science, arts and commerce streams.

For testing this hypothesis, one-way analysis of variance technique was applied to the scores of executive style. The summary of the results in this regard has been given in table 4.42.

Table 4.42 Summary of One-way ANOVA for the scores of Executive style in respect of stream groups

Source of Variance	df	SS	MS	F-Ratio
Between Group	2	108.446	54.223	1.139 NS
Within Group	368	17521.883	47.613	
Total	370	17630.329		

NS = Not Significant at 0.05 level

Table 4.42 exhibits that the 'F'-ratio for executive style was obtained as 1.139, which is not significant at 0.05 level with df 2 and 368. It implies that there was no significant difference among the students of three streams namely - science, arts and commerce streams with reference to their executive style of thinking. In other words, streams have no significant influence on executive style of thinking of college students. Hence the research hypothesis stating that, there will be significant difference in executive style of college students belonging to science, arts and commerce streams was rejected.

HYPOTHESIS – 3.6

There will be significant difference in Judicial Style of thinking of college students belonging to science, arts and commerce streams.

The summary obtained of one-way analysis of variance computed with reference to testing of above-mentioned hypothesis is in table 4.43.

Table 4.43 Summary of One-way ANOVA for the scores of Judicial style in respect of stream groups

Source of Variance	df	SS	MS	F-Ratio
Between Group	2	32.240	16.120	0.410 NS
Within Group	368	14461.458	39.297	
Total	370	14493.698		

NS = Not Significant at 0.05 level

This may be observed from the table 4.43 that the 'F'-ratio (0.410) obtained for the judicial style is too small to become significant at 0.05 level. This implies that the students belonging to science, arts and commerce streams were alike with regard to their judicial style of thinking. Hence the research hypothesis which states that there will be significant difference in judicial style of thinking of college students belonging to science, arts and commerce stream was rejected.

HYPOTHESIS – 3.7

There will be significant difference in Monarchic Style of thinking of college students belonging to science, arts and commerce stream.

In order to test the above hypothesis, One-way ANOVA was computed. The results obtained from this have been reported in Table 4.44

Table 4.44 Summary of One-way ANOVA for the scores of Monarchic style in respect of stream groups

Source of Variance	df	SS	MS	F-Ratio
Between Group	2	289.945	144.973	2.369 NS
Within Group	368	22518.464	61.191	
Total	370	22808.410		

NS = Not Significant at 0.05 level

Table 4.44 shows that the 'F'-ratio for monarchic style was obtained as 2.369 which is not significant at 0.05 level because it remained less than the tabled value of 'F' with df 2 and 368. It means there were no significant difference in the mean scores of monarchic style of thinking in respect of three streams groups viz. – science, arts and commerce streams. They were more or less equal on Monarchic style of thinking. Hence the research hypothesis which indicates that there will be significant difference in monarchic style of college students belonging to science, arts and commerce stream was rejected.

HYPOTHESIS – 3.8

There will be significant difference in Hierarchical Style of thinking of college students belonging to science, arts and commerce stream.

Table 4.45 gives the summary of results.

Table 4.45 Summary of One-way ANOVA for the scores of Hierarchical style in respect of stream groups

Source of Variance	df	SS	MS	F-Ratio
Between Group	2	161.010	80.505	1.419 NS
Within Group	368	20883.658	56.749	
Total	370	21044.668		

NS = Not Significant at 0.05 level

It is evident from the table 4.45 that the 'F'-ratio for hierarchical thinking style in respect of science, arts and commerce students came out to be 1.419 which is not significant ($p > 0.05$, df = 2 and 368). It indicates that science, arts and commerce students did not differ significantly with regard to hierarchical thinking style. In other words, three groups of

students based on stream were almost equal in adoption of hierarchical thinking style. Hence the research hypothesis stating that there will be significant difference in hierarchical style of college students belonging to science, arts and commerce streams was rejected.

HYPOTHESIS – 3.9

There will be significant difference in Oligarchic Style of thinking of college students belonging to science, arts and commerce stream.

The obtained results have been provided in table 4.46.

Table 4.46 Summary of One-way ANOVA for the scores of Oligarchic style in respect of stream groups

Source of Variance	df	SS	MS	F-Ratio
Between Group	2	112.103	68.535	1.131 NS
Within Group	368	18968.233	52.354	
Total	370	19080.336		

NS = Not Significant at 0.05 level

This may be observed from the table 4.46 that the 'F'-ratio (1.131) obtained for the oligarchic style is too small to become significant at 0.05 level. This implies that the students belonging to science, arts and commerce streams were alike with regard to their oligarchic style of thinking. Hence the research hypothesis which states that there will be significant difference in oligarchic style of thinking of college students belonging to science, arts and commerce stream was rejected.

HYPOTHESIS – 3.10

There will be significant difference in anarchic Style of thinking of college students belonging to science, arts and commerce streams.

The summary obtained of one-way analysis of variance computed with reference to testing of above-mentioned hypothesis is in table 4.43.

Table 4.47 Summary of One-way ANOVA for the scores of Anarchic style in respect of stream groups

Source of Variance	df	SS	MS	F-Ratio
Between Group	2	34.140	14.130	1.626 NS
Within Group	368	13451.431	34.792	
Total	370	13485.571		

NS = Not Significant at 0.05 level

Table 4.47 shows that the 'F'-ratio obtained for anarchic style of thinking is 1.626. It is not significant at 0.05 level ($p > 0.05$,df 2 and 368). It conveys the message that students belonging to science, art and commerce streams did not differ significantly with regard to anarchic style of thinking. In other words, all the three streams groups were equally anarchic in their thinking style. Hence the research hypothesis that there will be significant difference in anarchic style of thinking of college students belonging to science, art and commerce streams was rejected.

HYPOTHESIS – 3.11

There will be significant difference in Global Style of thinking of college students belonging to science, arts and commerce streams.

The summary obtained of one-way analysis of variance computed with regard to testing of hypothesis is given in table 4.48.

Table 4.48 Summary of One-way ANOVA for the scores of Global style in respect of stream groups

Source of Variance	df	SS	MS	F-Ratio
Between Group	2	15.402	7.701	0.159 NS
Within Group	368	17804.101	48.380	
Total	370	17819.504		

NS = Not Significant at 0.05 level

Table 4.48 reveals that the 'F'-ratio obtained for global style of thinking was 0.159. It is not significant at 0.05 level of significance ($p > 0.05$, df = 2 and 368). It leads us to conclude that students belonging to science, arts and commerce groups did not differ significantly with regard to their global style of thinking. In other words, the global style of thinking does not affect significantly the students of science, arts and commerce streams. Hence the research hypothesis stating that there will be significant difference in global style of thinking of college students belonging to science, arts and commerce streams was rejected.

HYPOTHESIS – 3.12

There will be significant difference in Local Style of thinking of college students belonging to science, arts and commerce streams.

The summary obtained of One-way ANOVA computed with regard to testing of hypothesis is given below in table 4.49.

Table 4.49 Summary of One-way ANOVA for the scores of Local style in respect of stream groups

Source of Variance	df	SS	MS	F-Ratio
Between Group	2	292.727	146.363	3.075*
Within Group	368	17517.413	47.602	
Total	370	17810.140		

* Significant at 0.05 level

It is evident from table 4.49 that the 'F'-ratio obtained for local style of thinking is 3.075 which is significant at 0.05 level of significance ($p < 0.05$, df = 2 and 368). It suggests that students belonging to science, arts and commerce groups differed significantly with reference to local style of thinking. In other words, stream had significant effect on local style of thinking in respect of college students. Hence the research

hypothesis stating that there will be significant difference in local style of thinking of college students belonging to science, arts and commerce streams was accepted.

In order to find out the exact source of significance in the mean scores of the three groups, 't'-tests were performed on the local style of thinking. The obtained results of 't' analysis have been reported in table 4.50.

Table 4.50 Significance of Difference in Mean Scores of Local Style of Thinking in respect of Science, Arts and Commerce Students

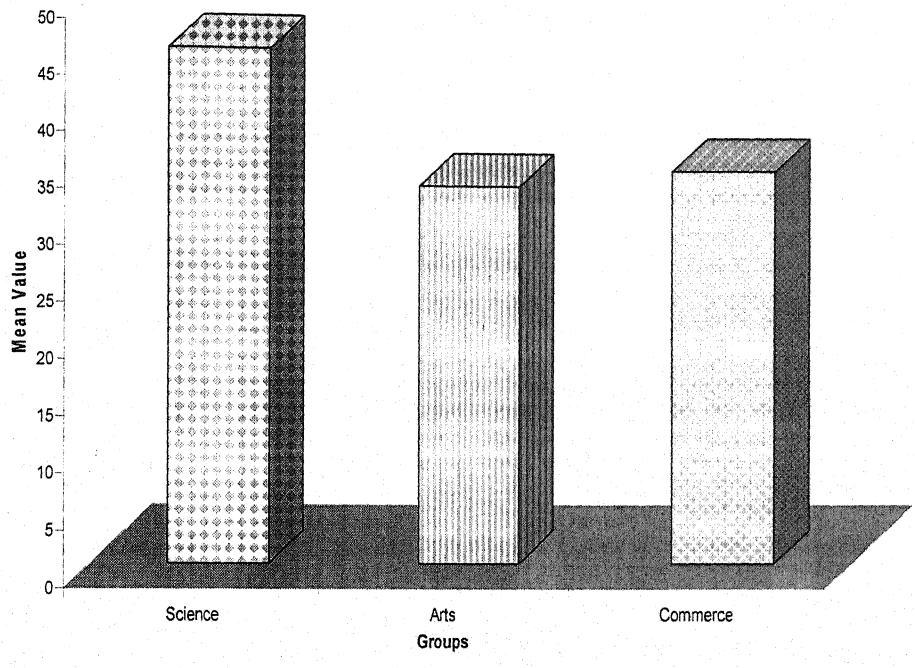
S. No.	Stream	N	M	S.D.	Comparison Group	't' value
1.	Science	193	45.42	7.25	1 and 2	2.492 *
2.	Arts	106	33.36	6.60	1 and 3	0.691 NS
3.	Commerce	72	34.79	6.35	2 and 3	1.451 NS

NS = Not Significant at 0.05 level * Significant at 0.05 level

It is clear from table 4.50 that the 't'-value of 2.492 was found to be significant at 0.05 level. It compares the scores of local style of thinking of science and arts stream groups. Since mean score of science group (M = 45.42) was greater than the mean score of arts group (M = 33.36). It may be concluded that science students were significantly higher on local style of thinking than arts students. The difference was true and not due to the chance or sampling fluctuation. The second and third 't'-values were turned out to be non-significant at 0.05 level as they did not reach the tabled value of 't' from this it may be inferred that science and commerce groups arts and commerce groups did not differ on local style of thinking.

In view of the above it may be said that science group was higher than arts in their local style of thinking.

Fig 4.7 Significance of Difference in Mean Scores of Local Style of Thinking in respect of Science, Arts and Commerce Students



HYPOTHESIS – 3.13

There will be significant difference in Internal Style of thinking of college students belonging to science, arts and commerce streams.

For testing this hypothesis, one-way analysis statistical technique was employed to the scores of internal style. The summary of the results is shown in table 4.51.

Table 4.51 Summary of One-way ANOVA for the scores of Internal style in respect of stream groups

Source of Variance	df	SS	MS	F-Ratio
Between Group	2	128.115	64.058	0.977*
Within Group	368	24128.483	65.566	
Total	370	24256.598		

* Significant at 0.05 level

The 'F'-ratio as exhibited from table 4.51 for internal style of thinking was obtained as 0.977, which is significant at 0.05 level of confidence ($p > 0.05, df = 2$ and 368). It implies that students belonging to science, arts and commerce groups did not exhibit any significant difference with reference to their internal style of thinking. Hence the research hypothesis stating that there will be significant difference in internal style of thinking of college students belonging to science, arts and commerce streams was not accepted.

HYPOTHESIS – 3.14

There will be significant difference in External Style of thinking of college students belonging to science, arts and commerce streams.

To test this hypothesis one-way analysis variance was computed. Table 4.52 below gives the summary of results.

Table 4.52 Summary of One-way ANOVA for the scores of External style in respect of stream groups

Source of Variance	df	SS	MS	F-Ratio
Between Group	2	604.315	302.158	4.130*
Within Group	368	26923.610	73.162	
Total	370	27527.924		

* Significant at 0.05 level

Table 4.52 reveals that the 'F'-ratio obtained for external style of thinking is 4.130, which is significant at 0.05 level of significance ($p < 0.05$, $df = 2$ and 368). It implies that students belonging to science, arts and commerce groups differed significantly with regard to their external style of thinking of college students. Hence the research hypothesis stating that there will be significant difference in external style of

thinking of college students belonging to science, and commerce streams was accepted.

To locate the exact source of significance, 't'-tests were performed on the mean scores of the external style of thinking. Table 4.53 below reports the results of 't'-value.

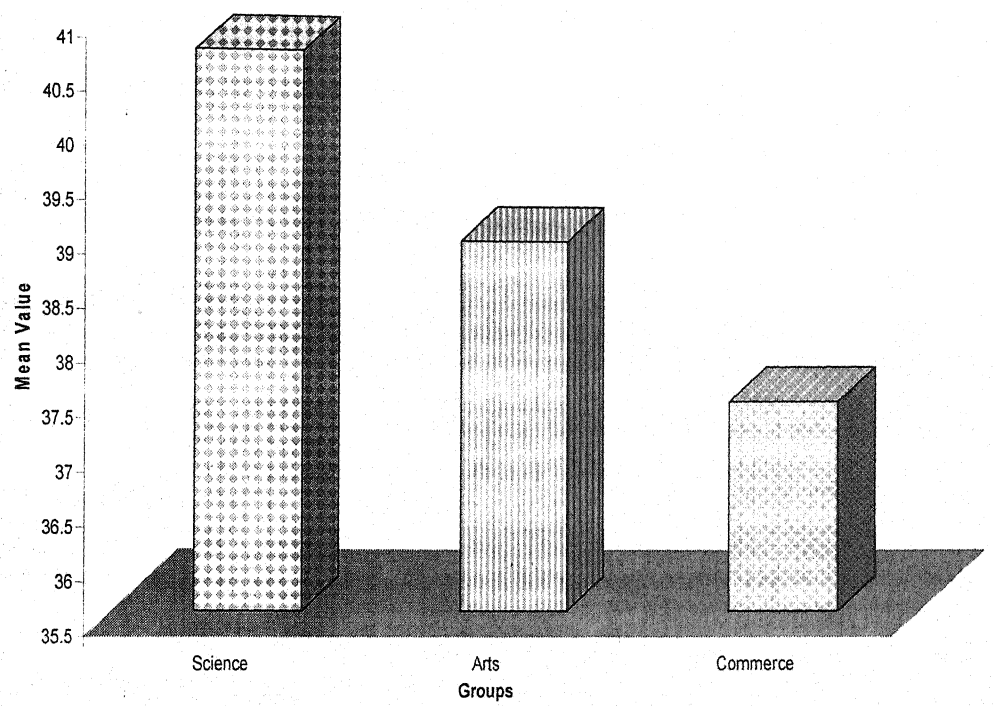
Table 4.53 Significance of Difference in Mean Scores of External Style of Thinking of Science, Arts and Commerce Students

S. No.	Stream	N	M	S.D.	Comparison Group	't' value
1.	Science	193	40.67	8.36	1 and 2	1.168 NS
2.	Arts	106	38.92	8.85	1 and 3	2.773*
3.	Commerce	72	37.44	8.63	2 and 3	1.111 NS

NS = Not Significant at 0.05 level * Significant at 0.01 level

It is evident from table 4.53 that the 't'-value 2.773 was found to be significant at 0.01 level. It compares the external style of thinking of science and commerce stream groups. Since mean score of science group (M = 40.67) is higher than the mean score of commerce group (M = 37.44). It thus leads us to conclude that science students were significantly higher on external style of thinking than commerce students. The difference was true and is not so due to the chance or sampling fluctuation. The second and third 't'-values turned out to be insignificant at 0.05 level as it did not reach the tabled value of 't'. Thus from this it may be inferred that science and arts groups and arts and commerce groups did not differ on external style of thinking.

Fig 4.8 Significance of Difference in Mean Scores of External Style of Thinking in respect of Science, Arts and Commerce Students



In view of the above, it may be concluded that science group was higher than the commerce group in the external style of thinking.

HYPOTHESIS – 3.15

There will be significant difference in Liberal Style of thinking of college students belonging to science, arts and commerce streams.

Table 4.54 gives the details of the computation of 'F'-ratio.

Table 4.54 Summary of One-way ANOVA for the scores of Liberal style in respect of stream groups

Source of Variance	df	SS	MS	F-Ratio
Between Group	2	289.858	144.930	2.1414 NS
Within Group	368	24912.158	67.696	
Total	370	25202.016		

NS = Not Significant at 0.05 level

Table 4.54 above shows that the 'F' ratio obtained for liberal style of thinking is 2.141, which is insignificant at 0.05 level of significance ($p > 0.05$, df = 2 and 368). This implies that students belonging to science, arts and commerce groups were alike with regard to their liberal style of thinking. Hence the research hypothesis, which states that there will be significant difference in liberal style of thinking of college students belonging to science, arts and commerce streams, was rejected.

HYPOTHESIS – 3.16

There will be significant difference in Conservative Style of thinking of college students belonging to science, arts and commerce

The summary of results in this regard has been given in table 4.55.

Table 4.55 Summary of One-way ANOVA for the scores of Liberal style in respect of stream groups

Source of Variance	df	SS	MS	F-Ratio
Between Group	2	24.005	12.002	0.211 NS
Within Group	368	20946.728	56.920	
Total	370	20970.733		

NS = Not Significant at 0.05 level

Table 4.55 discloses that the 'F'-ratio for conservative style of thinking was obtained as 0.211, which is insignificant at 0.05 level of significance ($p > 0.05$,df =2 and 368). It implies that there were no significant differences among the students of three streams *viz* - science, arts and commerce. Hence the research hypothesis stating there will be significant difference in conservative style of thinking of college students belonging to science, arts and commerce stream was not accepted.

4.4 THINKING STYLES IN RELATION TO PERSONALITY (Introvert and Extrovert Type)

TESTING HYPOTHESIS - 4(a)

Hypothesis 4(a) states that "**there will be significant differences in thinking styles of college students having extrovert and introvert personality".**

There are 16 thinking styles. Each style of thinking was studied separately. Therefore, it leads to formulation and testing of sixteen sub hypotheses. In the following paragraphs, the analysis by 't' test has been provided in respect of 16 styles.

HYPOTHESIS – 4(a) - 1

There will be significant difference in Left Hemispheric Style of thinking of college students having extrovert and introvert type personality.

This hypothesis was tested by 't' test. The results have been summarized in table 4.56.

Table 4.56 Significance of difference in mean scores of Left Hemispheric Style in respect of Extrovert and Introvert students

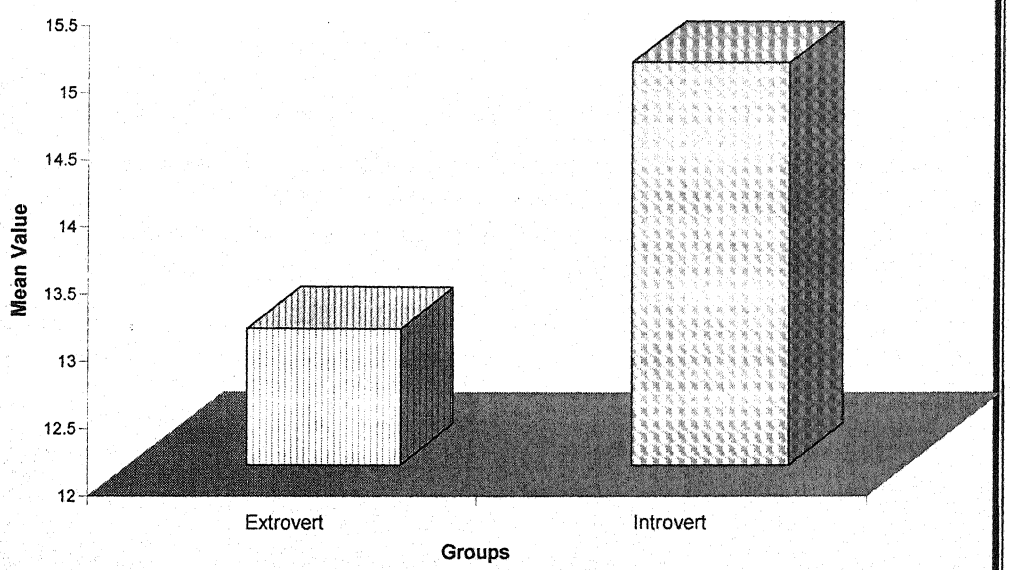
Group	N	Mean	S.D.	df	't' value	Significance
Extrovert	53	13.02	3.10	120	3.478	**
Introvert	69	15.04	3.28			

** significant at 0.01 level.

Table 4.56 exhibits that 't' value for left hemispheric style of thinking was obtained as 3.478, which is significant at 0.01 level. It means there was a significant difference between extrovert type and introvert type students on left hemispheric style of thinking. It is evident from the table 4.56 that the mean value of introvert type students is higher than extrovert type students (M=15.04 > M = 13.02). From this it may be

concluded that introvert type students tended to be higher than extrovert type students on left hemispheric style of thinking. Hence the hypothesis 4(a)-1 was accepted.

Fig 4.9 Significance of difference between mean scores of Left Hemispheric Style in respect of Extrovert and Introvert students



HYPOTHESIS – 4(a) - 2

There will be significant difference in Right Hemispheric Style of thinking of college students having extrovert and introvert type students.

The results of 't' test have been presented in table 4.57.

Table 4.57 Significance of difference in mean scores of Right Hemispheric Style in respect of Extrovert and Introvert students

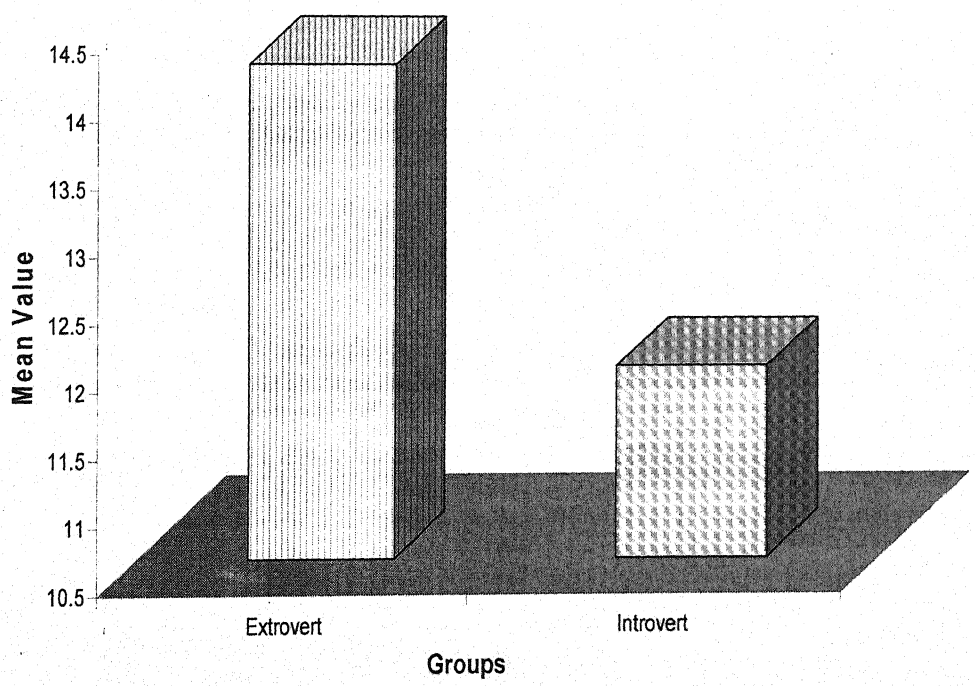
Group	N	Mean	S.D.	df	't' value	Significance
Extrovert	53	14.17	3.68	120	3.140	**
Introvert	69	11.93	4.18			

** significant at 0.01 level.

It is apparent from table 4.57 that 't' value for right hemispheric style of thinking came out to be 3.140, which is significant at 0.01 level. It leads to acceptance of hypothesis 4(a)-2. It indicates that there is significant difference between extrovert and introvert type students on right hemispheric style of thinking.

It is further evident from the above table that the mean value of extrovert group is greater than introvert group (M = 14.17 > M = 11.93). From this it may be concluded that extrovert type students are more prone to right hemispheric thinking style than introvert type students.

Fig 4.10 Significance of difference between mean scores of Right Hemispheric Style in respect of Extrovert and Introvert students



HYPOTHESIS – 4(a) – 3

There will be significant difference in Integrated Hemispheric thinking style of college students having extrovert and introvert type personality.

The statistics calculated for testing the significance of difference in mean scores of integrated thinking style is given in table 4.58.

Table 4.58 Significance of difference in mean scores of Integrated Hemispheric Style in respect of Extrovert and Introvert students

Group	N	Mean	S.D.	df	't' value	Significance
Extrovert	53	13.94	5.30	120	0.353	NS
Introvert	69	13.62	4.50			

NS = Not significant at 0.05 level.

Table 4.58 shows that 't' value came out to be 0.353, which is significant at 0.05 level. It leads to rejection of concerned hypothesis. In view of the above it may be stated that there is no significant difference between extrovert and introvert type students on integrated hemispheric style of thinking. Although mean difference is in favour of extrovert type students, it is not statistically significant. This implies that the difference in the two means was not true one, and may be ascribed to chance error or sampling fluctuations.

HYPOTHESIS – 4(a) – 4

There will be significant difference in Legislative Style of thinking of college students having extrovert and introvert type personality.

The statistics calculated for 't' test is given in table 4.59.

Table 4.59 Significance of difference in mean scores of Legislative Style in respect of Extrovert and Introvert students

Group	N	Mean	S.D.	df	't' value	Significance
Extrovert	53	41.4	7.17	120	0.509	NS
Introvert	69	42.06	7.01			

NS = Not significant at 0.05 level.

Table 4.59 shows that the 't'-value for testing the significance of difference between the means of legislative thinking style was found to be 0.509 which is not significant ($p > 0.05$). This lead to the rejection of the hypothesis 4(a)-4. It means that extrovert type and introvert type students did not differ significantly on legislative thinking style. In other words, both the groups were almost equal with legislative thinking style.

HYPOTHESIS 4(a) - 5

There will be significant difference in Executive Style of thinking of college students having extrovert and introvert type personality.

The results obtained from 't' test in this regard have been shown in table 4.60.

Table 4.60 Significance of difference in mean scores of Executive Style in respect of Extrovert and Introvert students

Group	N	Mean	S.D.	df	't' value	Significance
Extrovert	53	41.87	7.16	120	0.966	NS
Introvert	69	40.59	7.37			

NS = Not significant at 0.05 level.

It is evident from table 4.60 that 't' value obtained as 0.966, which is less than the tabled value of 't'. Hence it was non-significant. From this it may be inferred that the research hypothesis 4 (a) - 5 was rejected. It may be interpreted to mean that there was no significant difference between extrovert type and introvert type students on executive thinking style. Both the groups were at par on his thinking style.

HYPOTHESIS 4(a) - 6

There will be significant difference in Judicial Style of thinking of college students having extrovert and introvert type personality.

Table 4.61 provides the statistics with regard to testing the above-mentioned hypothesis.

Table 4.61 Significance of difference in mean scores of Judicial Style in respect of Extrovert and Introvert students

Group	N	Mean	S.D.	df	't' value	Significance
Extrovert	53	37.02	6.49	120	1.448	NS
Introvert	69	38.78	6.08			

NS = Not significant at 0.05 level.

It is clear from the table 4.61 that the obtained 't'-value (1.448) is non-significant ($p > 0.05$). This suggests that there was no significant difference between extrovert type and introvert type students on judicial thinking style. A look at the mean values of the two groups reveals that perhaps introvert type students were more judicial thinking style prone, but it was because of chance factor. Hence it cannot be taken as true. Since the mean difference was not statistically significant, the research hypothesis 4(a) - 6 was rejected.

HYPOTHESIS 4(a) - 7

There will be significant difference in Monarchic thinking style of college students having extrovert and introvert type personality.

The calculated statistics with regard to testing of above hypothesis have been given in table 4.62.

Table 4.62 Significance of Difference in mean scores of Monarchic Style in respect of Extrovert and Introvert students

Group	N	Mean	S.D.	df	't' value	Significance
Extrovert	53	34.00	7.30	120	0.02	NS
Introvert	69	33.97	9.06			

NS = Not significant at 0.05 level.

It is apparent from the table 4.62 that 't'-value for monarchic thinking style came out to be 0.020 which is too little the value to become significant at 0.05 level. Thus leads to the conclusion that the research hypothesis 4(a) - 7 was rejected, which stated that there is significant difference in monarchic style of extrovert and introvert type students. It may be said that the groups were at par on monarchic thinking style.

HYPOTHESIS 4(a) - 8

There will be significant difference in Hierarchic Style of thinking of college students having extrovert and introvert type personality.

To test the above hypothesis, 't'-test was applied, the result of which is given in table 4.63.

Table 4.63 Significance of difference in mean scores of Hierarchic Style in respect of Extrovert and Introvert students

Group	N	Mean	S.D.	df	't' value	Significance
Extrovert	53	43.30	7.01	120	0.162	NS
Introvert	69	43.51	7.26			

NS = Not significant at 0.05 level.

It may be seen in table 4.63 that the 't'-value came out to be 0.162, which is non-significant ($p > 0.05$). This leads to the inference that there was no significant difference in hierarchic style of thinking in respect of extrovert and introvert type students. Hence the research hypothesis 4(a) - 8 was rejected.

HYPOTHESIS 4(a) - 9

There will be significant difference in Oligarchic Style of thinking of college students having extrovert and introvert type personality.

For testing the above hypothesis 't'-ratio was calculated. The obtained 't'-ratio along with mean and standard deviation are given 4.64.

Table 4.64 Significance of Difference in mean scores of Oligarchic Style in respect of Extrovert and Introvert students

Group	N	Mean	S.D.	df	't' value	Significance
Extrovert	53	31.28	6.29	120	0.456	NS
Introvert	69	31.84	7.24			

NS = Not significant at 0.05 level.

It may be observed in table 4.64 that the observed 't'-value (0.456) remained below the desired level of tabled 't'-value. Hence it was non-significant. From this it may be said that extrovert and introvert type students did not show any significant difference in their mean scores of oligarchic style of thinking. Alternatively, it may be stated that both the groups were alike with regard to oligarchic style of thinking. Hence the research hypothesis 4(a) - 9 was rejected.

HYPOTHESIS 4(a) - 10

There will be significant difference in Anarchic thinking style of college students having extrovert and introvert type personality.

The statistics calculated for this hypothesis are given in table 4.65.

Table 4.65 Significance of difference in mean scores of Anarchic Style in respect of Extrovert and Introvert students

Group	N	Mean	S.D.	df	't' value	Significance
Extrovert	53	35.74	6.33	120	1.125	NS
Introvert	69	34.25	8.30			

NS = Not significant at 0.05 level.

It is evident from the table 4.65 that 't'-value for anarchic thinking style came out to be 1.125, which is not significant at 0.05 level. Hence it leads to the conclusion that the research hypothesis 4(a) - 10 was not accepted which stated that there is significant difference in anarchic thinking style of extrovert and introvert type students. Thus it may be said that both the groups were equally anarchic in their thinking style.

HYPOTHESIS 4(a) - 11

There will be significant difference in Global thinking style of college students having extrovert and introvert type personality.

To test this hypothesis, 't'-test was performed, the results of which have been reported in table 4.66.

Table 4.66 Significance of Difference in mean scores of Global Style in respect of Extrovert and Introvert students

Group	N	Mean	S.D.	df	't' value	Significance
Extrovert	53	33.81	6.89	120	0.031	NS
Introvert	69	33.77	7.48			

NS = Not significant at 0.05 level.

It is clear from the table 4.66 that 't'-value came out to be 0.031 which too small to be significant at 0.05 level of significance ($p > 0.05$). It may thus be inferred that there was no significant difference in global style of thinking in respect of extrovert type and introvert type students. Hence the concerned research hypothesis was rejected.

HYPOTHESIS 4(a) - 12

There will be significant difference in Local thinking style of college students having extrovert and introvert type personality.

Table 4.67 provides the statistics with regard to testing the above-mentioned hypothesis.

Table 4.67 Significance of difference in mean scores of Local Style in respect of Extrovert and Introvert students

Group	N	Mean	S.D.	df	't' value	Significance
Extrovert	53	34.6	6.75	120	0.894	NS
Introvert	69	35.82	8.34			

NS = Not significant at 0.05 level.

Table 4.67 clarifies that the obtained 't'-value (0.894) is non-significant ($p > 0.05$). It suggests that there was no significant difference in extrovert type and introvert type students with respect to their local style of thinking. The mean value scores however reveals that introvert type students are more local than extrovert type in local thinking style. It may be anticipated to chance factor. Since the mean difference was not statistically significant, the concerned research hypothesis was rejected.

HYPOTHESIS 4(a) - 13

There will be significant difference in Internal thinking style of college students having extrovert and introvert type personality.

The statistics with regard to testing the above-mentioned hypothesis have been reported in table 4.68.

Table 4.68 Significance of difference in mean scores of Internal Style in respect of Extrovert and Introvert students

Group	N	Mean	S.D.	df	't' value	Significance
Extrovert	53	35.08	8.55	120	0.396	NS
Introvert	69	35.70	8.6			

NS = Not significant at 0.05 level.

The 't'-value of internal thinking style as reported in table 4.68 is 0.396, which is not significant at 0.05 level of confidence. From this it may be inferred that the research hypothesis stating that there will be significant difference in internal thinking style of extrovert and introvert type students was rejected. Hence it may be concluded that both the groups were at par in this thinking style.

HYPOTHESIS 4(a) – 14

There will be significant difference in External thinking style of college students having extrovert type and introvert type personality.

The statistics computed for 't'-test is given in table 4.69.

Table 4.69 Significance of difference in mean scores of External Style in respect of Extrovert and Introvert students

Group	N	Mean	S.D.	df	't' value	Significance
Extrovert	53	38.66	9.69	120	1.384	NS
Introvert	69	41.00	8.67			

NS = Not significant at 0.05 level.

Table 4.69 shows that the obtained 't'-value of external thinking style was found to be 1.384, which is statistically not significant ($p > 0.05$). It leads to the rejection of the research hypothesis 4(a) - 14. It implies that extrovert type and introvert type students did not differ significantly in external thinking style. In other words, both groups show equal preference to external style of thinking.

HYPOTHESIS 4(a) – 15

There will be significant difference in Liberal thinking of college students having extrovert and introvert type personality.

The results obtained from 't'-test in this regard have been shown in table 4.70.

Table 4.70 Significance of difference in mean scores of Liberal Style in respect of Extrovert and Introvert students

Group	N	Mean	S.D.	df	't' value	Significance
Extrovert	53	41.09	8.95	120	0.613	NS
Introvert	69	42.04	8.54			

NS = Not significant at 0.05 level.

It is evident from the table 4.70 that 't'-value obtained was 0.613, which is less than the tabled value of 't'. Hence it was non-significant. Hence the research hypothesis 4(a) - 15 was rejected. Thus it may be concluded that there was no significant difference between extrovert type and introvert type students in liberal thinking style.

HYPOTHESIS 4(a) – 16

There will be significant difference in Conservative thinking style of college students having extrovert and introvert type personality.

't' test was performed in this regard. The results for the same have been reported in table 4.71.

Table 4.71 Significance of difference in mean scores of Conservative Style in respect of Extrovert and Introvert students

Group	N	Mean	S.D.	df	't' value	Significance
Extrovert	53	30.98	8.14	120	0.805	NS
Introvert	69	32.16	7.88			

NS = Not significant at 0.05 level.

Table 4.71 exhibits that the 't'-value for conservative style of thinking was obtained as 0.805, which is not significant at 0.05 level thereby rejecting the concerned research hypothesis. It means that there was no significant difference between extrovert type and introvert type students on conservative style of thinking.

4.5 THINKING STYLES IN RELATION TO PERSONALITY

(Neurotic and Stable Type)

TESTING HYPOTHESIS 4 (b)

There will be significant differences in thinking styles of college students having neurotic type and stable type personality.

There are sixteen styles of thinking of college students. Each style is discussed separately. Hence it includes sixteen sub hypotheses. In the following paragraphs, the analysis by 't' tests has been provided in respect of sixteen styles.

HYPOTHESIS 4(b) – 1

There will be significant difference in Left Hemispheric thinking style of college students having neurotic and stable type personality.

To test this hypothesis, 't'-test was applied The observed result have been shown in table 4.72.

Table 4.72 Significance of difference in mean scores of Left Hemispheric Style in respect of Neurotic and Stable students

Group	N	Mean	S.D.	df	't' value	Significance
Neurotic	71	13.49	3.34	127	1.45	NS
Stable	58	14.36	3.43			

NS = Not significant at 0.05 level.

Table 4.72 shows that the 't'-value was obtained as 1.450, which is not significant (p.> 0.05). This implies that college students of neurotic and stable type did not differ significantly on left hemispheric style of thinking. Hence the research hypothesis 4(b)-1 was rejected.

HYPOTHESIS 4(b) – 2

There will be significant difference in Right Hemispheric thinking style of college students having neurotic and stable type personality.

For testing this hypothesis, 't'-test was performed, the results of which have been supplied in table 4.73.

Table 4.73 Significance of difference in mean scores of Right Hemispheric Style in respect of Neurotic and Stable students

Group	N	Mean	S.D.	df	't' value	Significance
Neurotic	71	12.84	3.49	127	0.298	NS
Stable	58	13.03	3.687			

NS = Not significant at 0.05 level.

From the above table 4.73 the 't'-value for the right hemispheric style of thinking was obtained to be 0.298. It is non significant at 0.05 level of significance. It thus leads us to conclude that the research hypothesis 4(b)-2 stating that there will be significant difference in right hemispheric style of thinking was rejected. Thus it may be inferred that both neurotic and stable type of students are equally right oriented in their thinking.

HYPOTHESIS 4(b) – 3

There will be significant difference in Integrated Hemispheric thinking style of college students having neurotic and stable type personality.

Table 4.74 below gives the detail for the 't'-value computed for the integrated thinking style.

Table 4.74 Significance of Difference in mean scores of Integrated Hemispheric Style in respect of Neurotic and Stable students

Group	N	Mean	S.D.	df	't' value	Significance
Neurotic	71	12.37	3.01	127	0.877	NS
Stable	58	12.93	4.03			

NS = Not significant at 0.05 level.

As evident from table 4.74 the 't'-value for obtained as 0.877, which is insignificant at 0.05 level of confidence. Hence the research hypothesis 4(b)-3 stating that there will be significant difference in integrated hemispheric style of thinking was rejected. Therefore it may be inferred that both neurotic type and stable type students are equally oriented in their thinking style.

HYPOTHESIS 4(b) – 4

There will be significant difference in Legislative Style of thinking of college students having neurotic and stable type personality.

't'-test was performed to test this hypothesis. The results for the same have been reported in table 4.75.

Table 4.75 Significance of Difference in mean scores of Legislative Style in respect of Neurotic and Stable students

Group	N	Mean	S.D.	df	't' value	Significance
Neurotic	71	40.75	7.02	127	0.426	NS
Stable	58	41.28	7.05			

NS = Not significant at 0.05 level.

Table 4.75 exhibits that the 't' value for legislative style of thinking was obtained as 0.426, which is insignificant at 0.05 level. It means that there is no significant difference between neurotic and stable type students on legislative style of thinking. It is also evident from the table that the mean values of stable type students are higher than neurotic type students (M = 41.28 > M = 40.75) but this difference is not statistically significant. Hence hypothesis 4(b)-4 was rejected.

HYPOTHESIS 4(b) – 5

There will be significant difference in Executive Style of thinking of college students having neurotic and stable type personality.

The results of 't'- test have been shown in table 4.76.

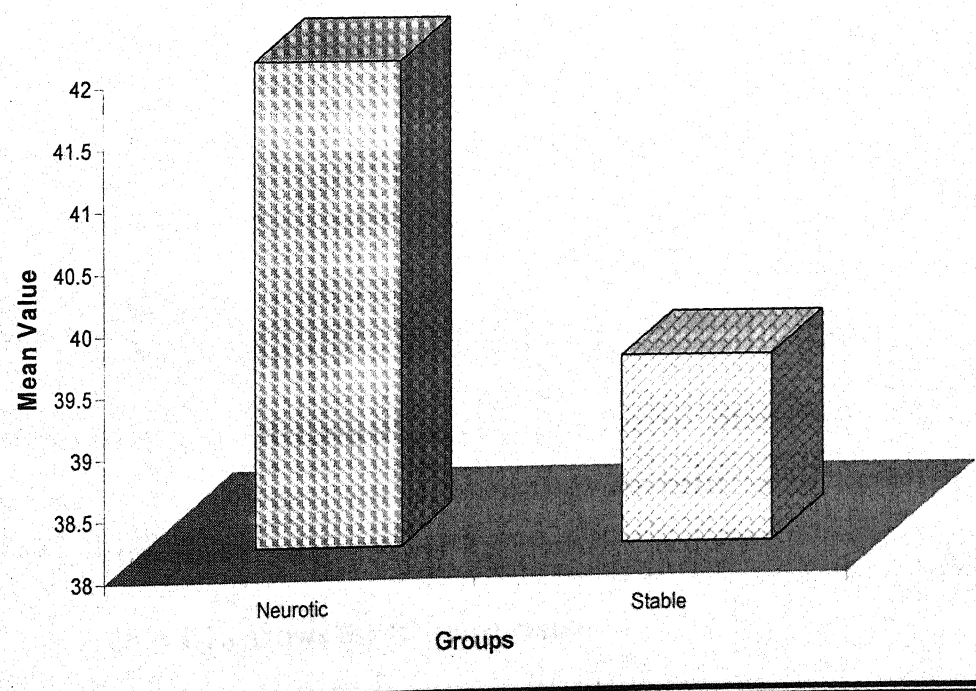
Table 4.76 Significance of difference in mean scores of Executive Style in respect of Neurotic and Stable students

Group	N	Mean	S.D.	df	't' value	Significance
Neurotic	71	41.49	6.0	127	2.007	*
Stable	58	39.52	7.41			

* significant at 0.05 level.

From table 4.76, it is apparent that the 't'-value for executive style of thinking came out to be 2.007, which is significant at 0.05 level ($p > 0.05$). It leads to the acceptance of the hypothesis 4(b)-5 indicating that there is a significant difference between neurotic type and stable type students on legislative style of thinking.

Fig 4.11 Significance of difference between mean scores of Executive Style in respect of Neurotic and Stable students



Furthermore it is clear from the table that neurotic type (M = 41.94) students mean value scores were higher than stable (M =39.52) type students, which leads to conclude that neurotic type students are more prone to executive thinking style as compared to stable type students.

HYPOTHESIS 4(b) – 6

There will be significant difference in Judicial Style of thinking college students having neurotic and stable type personality.

The 't'-value concluded for this hypothesis is given in table 4.77

Table 4.77 Significance of difference in mean scores of Judicial Style in respect of Neurotic and Stable students

Group	N	Mean	S.D.	df	't' value	Significance
Neurotic	71	38.35	6.38	127	0.878	NS
Stable	58	37.38	6.12			

NS = Not significant at 0.05 level.

Table 4.77 shows that the 't' value for judicial style of thinking come out to be 0.878, which is not significant at 0.05 level ($p > 0.05$), thereby rejecting the research hypothesis stating that there will be significant difference in judicial style of thinking of neurotic and stable type students.

HYPOTHESIS 4(b) – 7

There will be significant difference in Monarchic Style of thinking of college students having neurotic and stable type personality.

Table 4.78 shows the 't'-value results.

Table 4.78 Significance of difference in mean scores of Monarchic Style in respect of Neurotic and Stable students

Group	N	Mean	S.D.	df	't' value	Significance
Neurotic	71	33.84	7.78	127	0.331	NS
Stable	58	33.38	7.89			

NS = Not significant at 0.05 level.

It is apparent from table 4.78 the 't'-value for monarchic thinking was obtained as 0.331, which is not significant at 0.05 level of significance. It implies that there was no significant difference in monarchic style of thinking of neurotic and stable type students. Hence the concerned research hypothesis was rejected.

HYPOTHESIS 4(b) – 8

There will be significant difference in Hierarchic Style of thinking of college students having neurotic and stable type personality.

't'-test was performed for testing the above hypothesis. The results of the same have been reported in table 4.79.

Table 4.79 Significance of difference in mean scores of Hierarchic Style in respect of Neurotic and Stable students

Group	N	Mean	S.D.	df	't' value	Significance
Neurotic	71	43.1	7.34	127	1.127	NS
Stable	58	41.59	7.75			

NS = Not significant at 0.05 level.

It is evident from table 4.79 the 't'-value for hierarchic style came out to be 1.127, which is not significant at 0.05 level ($p > .05$). Hence the

research hypothesis which states that there will be significant difference in hierarchic style of thinking of neurotic and stable type students was rejected. It implies that the difference in the two means was not true; it may be attributed due to chance error or sampling fluctuations.

HYPOTHESIS 4(b) – 9

There will be significant difference in Oligarchic Style of thinking of college students having neurotic and stable type personality.

The statistics calculated for 't'-test is given in table 4.80.

Table 4.80 Significance of Difference in mean scores of Oligarchic Style in respect of Neurotic and Stable students

Group	N	Mean	S.D.	df	't' value	Significance
Neurotic	71	31.65	6.07	127	0.373	NS
Stable	58	32.10	7.36			

NS = Not significant at 0.05 level.

Table 4.80 shows that the 't' value for testing the significance of difference between the mean scores of oligarchic style of thinking was found to be 0.373 which is not statistically significant ($p > 0.05$). This lead to the rejection of the hypothesis 4(b)-9. It means that neurotic and stable type students do not differ significantly in oligarchic thinking style. In other words both the groups were almost equal with respect to oligarchic thinking style.

HYPOTHESIS 4(b) – 10

There will be significant difference in Anarchic Style of thinking of college students having neurotic and stable type personality.

The results obtained from 't'-test in this regard have been sown in table 4.81.

Table 4.81 Significance of Difference in mean scores of Anarchic Style in respect of Neurotic and Stable students

Group	N	Mean	S.D.	df	't' value	Significance
Neurotic	71	35.68	7.68	127	0.656	NS
Stable	58	34.78	7.82			

NS = Not significant at 0.05 level.

It is evident from table 4.81 the 't'-value was found to be 0.656, which is less than the tabled value of 't'. Hence it was not significant. From this it may be inferred that the research hypothesis 4(b) -10 was rejected. It may thus be interpreted that there was no significant difference between neurotic and stable type students on anarchic style of thinking. Both the groups were at par on this thinking style.

HYPOTHESIS 4(b) – 11

There will be significant difference in Global Style of thinking of college students having neurotic and stable type personality.

Table 4.82 provides the statistics with regard to testing of the above-mentioned hypothesis.

Table 4.82 Significance of difference in mean scores of Global Style in respect of Neurotic and Stable students

Group	N	Mean	S.D.	df	't' value	Significance
Neurotic	71	32.35	6.43	127	0.656	NS
Stable	58	32.95	8.63			

NS = Not significant at 0.05 level.

It is clear from table 4.82 that the obtained 't'-value (0.461) is non-significant ($p > 0.05$). This suggests that there was no significant difference between neurotic and stable type students in global style of thinking. However the mean value scores reveals that stable type students were more global than neurotic type students but in fact it was because of the chance factor. Hence it can't be taken as true. Since the mean difference was not statistically significant, the research hypothesis 4(b)-11 was rejected.

HYPOTHESIS 4(b) – 12

There will be significant difference in Local Style of thinking of college students having neurotic and stable type personality.

't'-test was used to test this hypothesis, the results of which have been reported in table 4.83.

Table 4.83 Significance of Difference in mean scores of Local Style in respect of Neurotic and Stable students

Group	N	Mean	S.D.	df	't' value	Significance
Neurotic	71	35.84	6.78	127	0.710	NS
Stable	58	34.93	7.60			

NS = Not significant at 0.05 level.

It is apparent from table 4.83 the 't'-value for local thinking style came out to be 0.710, which is too little to become significant at 0.05 level of significance. This leads to the conclusion that the research hypothesis 4(b)-12 was rejected, which stated that there will be significant difference in local style of thinking of neurotic and stable type students. It may be said that both groups were alike on local thinking style.

HYPOTHESIS 4(b) – 13

There will be significant difference in Internal Style of thinking college students having neurotic type and stable type personality.

To test this hypothesis 't'-test was applied, the results of which is given in table 4.84.

Table 4.84 Significance of Difference in mean scores of Internal Style in respect of Neurotic and Stable students

Group	N	Mean	S.D.	df	't' value	Significance
Neurotic	71	35.22	7.88	127	0.697	NS
Stable	58	36.24	8.57			

NS = Not significant at 0.05 level.

It may be seen from table 4.84 the 't'-value came out to be 0.697, which is non-significant ($p > 0.05$). This leads to the inference that there was no significant difference in internal style of thinking in respect of neurotic and stable type students. Hence the research hypothesis 4. (b)-13 was rejected.

HYPOTHESIS 4(b) – 14

There will be significant difference in External Style of thinking college students having neurotic and stable type personality.

For testing this hypothesis 't'-ratio was calculated. The observed 't'-ratio along with mean and standard deviation are given in table 4.85.

Table 4.85 Significance of Difference in mean scores of External Style in respect of Neurotic and Stable students

Group	N	Mean	S.D.	df	't' value	Significance
Neurotic	71	40.49	8.20	127	1.520	NS
Stable	58	38.07	9.60			

NS = Not significant at 0.05 level.

It may be observed from table 4.85 that the obtained 't'-value (1.520) was insignificant at 0.05 level of confidence. From this it may be said that neurotic and stable type students did not show any significant difference in their mean scores on external style of thinking. Hence the research hypothesis 4 (b)- 14 was rejected.

HYPOTHESIS 4(b) – 15

There will be significant difference in Liberal Style of thinking of college students having neurotic type and stable type personality.

The results of the statistics applied have been reported in table 4.86

Table 4.86 Significance of Difference in mean scores of Liberal Style in respect of Neurotic and Stable students

Group	N	Mean	S.D.	df	't' value	Significance
Neurotic	71	42.10	8.62	127	0.276	NS
Stable	58	41.71	7.40			

NS = Not significant at 0.05 level.

Table 4.86 shows that the 't' value for liberal thinking style was found to be 0.276, which is not statistically significant at 0.05 level ($p > 0.05$), thereby rejecting the hypothesis stating that there will be significant difference in liberal style of thinking of neurotic and stable type students.

HYPOTHESIS 4(b) – 16

There will be significant difference in Conservative Style of thinking of college students having neurotic and stable type personality.

This hypothesis was tested by 't'-test. The results for which have been summarized in table 4.87.

Table 4.87 Significance of difference in mean scores of Conservative Style in respect of Neurotic and Stable students

Group	N	Mean	S.D.	df	't' value	Significance
Neurotic	71	32.68	6.67	127	0.276	NS
Stable	58	31.04	6.71			

NS = Not significant at 0.05 level.

Table 4.87 exhibits that the 't' value for conservative style of thinking was found to be 1.385, which is not significant at 0.05 level 0.05). This lead to the rejection of research hypothesis 4(b) -16. It means that neurotic and stable type students did not differ significantly on conservative style of thinking. In other words both the groups were almost equal with respect to conservative style of thinking.

4.6 THINKING STYLES IN RELATION TO INTRINSIC MOTIVATION

TESTING HYPOTHESIS -5 (a)

This hypothesis states that **there will be significant differences in thinking styles of college students having high and low levels of Intrinsic Motivation.**

The high and low intrinsic motivation for the students has been compared on sixteen thinking styles. Hence the present hypothesis have been divided into sixteen sub-hypotheses. Each sub-hypothesis have been tested using 't'-test. The following paragraphs give the details of the analysis.

HYPOTHESIS 5(a) – 1

There will be significant difference in Left Hemispheric Style of thinking of college students having high and low levels of intrinsic motivation.

To test this hypothesis, 't'-test was applied. The obtained results have been shown in table 4.88.

Table 4.88 Significance of difference in mean scores of Left Hemispheric Style in respect of students with High Intrinsic Motivation and Low Intrinsic Motivation

Group	N	Mean	S.D.	df	t	Significance
High Intrinsic Motivation	72	14.08	3.44	134	1.694	NS
Low Intrinsic Motivation	64	13.14	3.03			

NS = Not significant at 0.05 level.

It is evident from table 4.88 that the 't'-value has been calculated as 1.694 for the comparison of mean of left hemispheric style of students with high and low intrinsic motivation. This 't'-value is not significant at 0.05 level. The table however reveals that the mean score was higher (M = 14.08) in favour of higher intrinsic motivation group than the mean score (M = 13.14) of low intrinsic motivation group, but it could not reach the significant level of tabled value. Hence the research hypothesis 5 (a) - 1 was rejected.

HYPOTHESIS 5(a) – 2

There will be significant difference in Right Hemispheric Style of thinking of college students having high and low levels of intrinsic motivation.

The results of 't'-test have been presented in table 4.89.

Table 4.89 Significance of difference in mean scores of Right Hemispheric Style in respect of students with High Intrinsic Motivation and Low Intrinsic Motivation

Group	N	Mean	S.D.	df	t	Significance
High Intrinsic Motivation	72	13.17	4.11	134	0.841	NS
Low Intrinsic Motivation	64	12.56	4.32			

NS = Not significant at 0.05 level.

It is apparent from table 4.89 that the 't'-value for right hemispheric style of thinking came out to be 0.841, which is not

significant ($p > 0.05$). It leads to the rejection of concerned research hypothesis. In view of the above, it may be stated that there was no significant difference between students with high intrinsic and low intrinsic motivation. It may be inferred that both high intrinsic motivation group and low intrinsic motivation group of students are almost equal in right hemispheric style of thinking.

HYPOTHESIS 5(a) – 3

There will be significant difference in Integrated Hemispheric Style of thinking of college students having high and low levels of intrinsic motivation.

The statistics calculated for testing this hypothesis have been reported in table 4.90.

Table 4.90 Significance of difference in mean scores of Integrated Hemispheric Style in respect of students with High Intrinsic Motivation and Low Intrinsic Motivation

Group	N	Mean	S.D.	df	t	Significance
High Intrinsic Motivation	72	14.96	5.27	134	1.198	NS
Low Intrinsic Motivation	64	13.98	4.26			

NS = Not significant at 0.05 level.

Table 4.90 shows that the 't' value for integrated hemispheric style of thinking was found to be 1.198, which is not significant at .05 level of significance, thereby rejecting the hypothesis 5(a) - 3. It means that students with high intrinsic motivation did not differ the students with low intrinsic motivation significantly in integrated style of thinking. In other words, both the groups were alike with respect to integrated style of thinking.

HYPOTHESIS 5(a) – 4

There will be significant difference in Legislative Style of thinking of college students having high and low levels of intrinsic motivation.

The results obtained from t-test in this regard have been shown in table 4.91.

Table 4.91 Significance of difference in mean scores of Legislative Style in respect of students with High Intrinsic Motivation and Low Intrinsic Motivation

Group	N	Mean	S.D.	df	t	Significance
High Intrinsic Motivation	72	40.97	6.64	134	0.653	NS
Low Intrinsic Motivation	64	40.22	6.72			

NS = Not significant at 0.05 level.

Table 4.91 exhibits that the 't'-value was found to be 0.653, which is less than the tabled value of 't'. Hence it was not significant. From this, it may be inferred that the research hypothesis 5(a) - 4 was rejected. Thus it may be interpreted that there was no significant difference between students with high intrinsic motivation and students with low intrinsic motivation.

HYPOTHESIS 5(a) – 5

There will be significant difference in Executive Style of thinking of college students having high and low levels of intrinsic motivation.

Table 4.92 provides the statistics applied for the testing this hypothesis.

Table 4.92 Significance of difference in mean scores of Executive Style in respect of students with High Intrinsic Motivation and Low Intrinsic Motivation

Group	N	Mean	S.D.	df	t	Significance
High Intrinsic Motivation	72	40.62	6.17	134	1.561	NS
Low Intrinsic Motivation	64	42.41	7.09			

NS = Not significant at 0.05 level.

It is clear from table 4.92 that the observed 't'-value (1.561) is non-significant ($p > 0.05$). This suggests that there was no significant difference between high intrinsic motivation of students and low intrinsic motivation group of students. A look at the mean value of the groups reveals that perhaps low intrinsic motivation were more executive thinking style prone than the high intrinsic motivation group of students but it may be attributed to chance factor or sampling fluctuations. Thus it can't be taken as true. Hence the hypothesis 5 (a)- 5 was rejected.

HYPOTHESIS 5(a) – 6

There will be significant difference in Judicial Style of thinking of college students having high and low levels of intrinsic motivation.

Table 4.93 below shows the result of 't'-test, which was performed to test the research hypothesis.

Table 4.93 Significance of difference in mean scores of Judicial Style in respect of students with High Intrinsic Motivation and Low Intrinsic Motivation

Group	N	Mean	S.D.	df	t	Significance
High Intrinsic Motivation	72	36.65	5.5	134	1.609	NS
Low Intrinsic Motivation	64	38.42	7.11			

NS = Not significant at 0.05 level.

It is evident from table 4.93 that the 't'-value was calculated to be 1.609, which is not significant statistically ($p > 0.05$). Hence the research hypothesis 5(a) - 6 was rejected. It implies that the students with high intrinsic motivation did not differ significantly in respect of judicial style of thinking. Instead both the groups are almost alike in judicial thinking style.

HYPOTHESIS 5(a) – 7

There will be significant difference in Monarchic Style of thinking of college students having high and low levels of intrinsic motivation.

The calculated statistics with regard to the testing of the above-mentioned hypothesis have been given in table 4.94.

Table 4.94 Significance of difference in mean scores of Monarchic Style in respect of students with High Intrinsic Motivation and Low Intrinsic Motivation

Group	N	Mean	S.D.	df	t	Significance
High Intrinsic Motivation	72	32.44	7.58	134	0.137	NS
Low Intrinsic Motivation	64	32.23	10.0			

NS = Not significant at 0.05 level.

It is apparent from table 4.94 that the 't'-value for monarchic thinking style came out to be 0.137, which is too little to be significant at 0.05 level of significance. This leads to the conclusion that hypothesis 5(a) - 7 was rejected which stated that there will be significant difference in monarchic style of thinking of students with high intrinsic motivation and low intrinsic motivation. It may be said that both the groups were at par on monarchic thinking style.

HYPOTHESIS 5(a) – 8

There will be significant difference in Hierarchic Style of thinking of college students having high and low levels of intrinsic motivation.

To test the above hypothesis 't' test was applied, the result of which have been reported in table 4.95.

Table 4.95 Significance of difference in mean scores of Hierarchic Style in respect of students with High Intrinsic Motivation and Low Intrinsic Motivation

Group	N	Mean	S.D.	df	t	Significance
High Intrinsic Motivation	72	43.69	6.72	134	0.815	NS
Low Intrinsic Motivation	64	42.59	8.74			

NS = Not significant at 0.05 level.

It may be seen from table 4.95 that the 't'-value came out to be 0.815, which is non-significant ($p > 0.05$). This leads to the inference that there was no significant difference in hierarchic thinking style in respect of students with high intrinsic motivation and low intrinsic motivation. Hence the research hypothesis 5(a) - 8 was rejected.

HYPOTHESIS 5(a) – 9

There will be significant difference in Oligarchic Style of thinking of college students having high and low levels of intrinsic motivation.

For testing the above hypothesis, 't'-ratio was calculated. The obtained 't'-ratio along with mean and standard deviation are given in table 4.96.

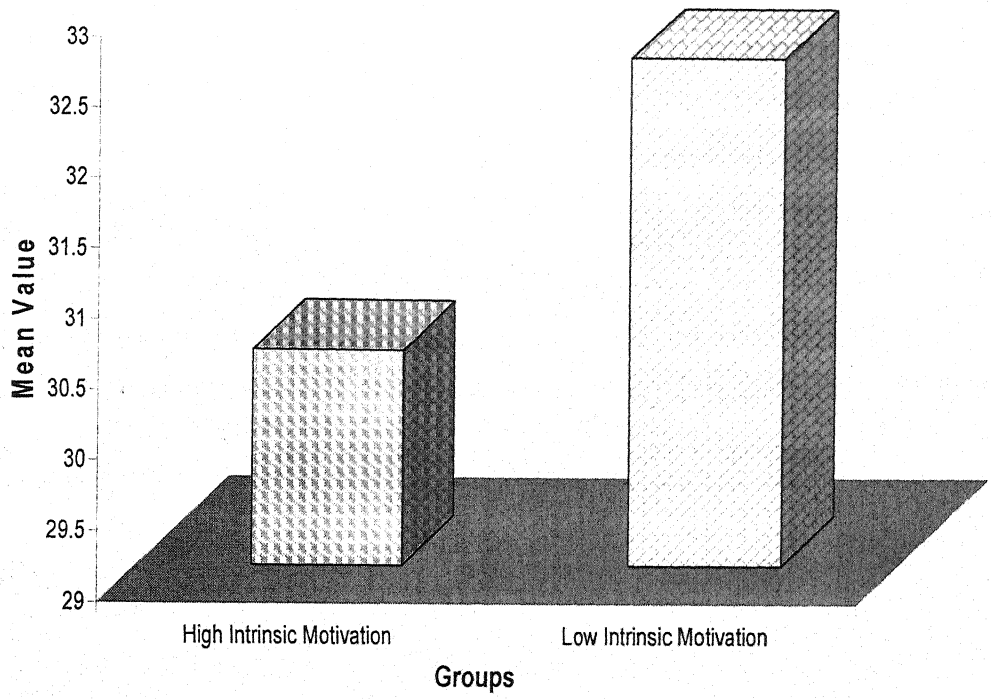
Table 4.96 Significance of difference in mean scores of Oligarchic Style in respect of students with High Intrinsic Motivation and Low Intrinsic Motivation

Group	N	Mean	S.D.	df	t	Significance
High Intrinsic Motivation	72	30.53	6.23	134	2.089	*
Low Intrinsic Motivation	64	32.64	5.55			

* significant at 0.05 level.

It may be observed from table 4.96 that the obtained 't'-value (2.089) as significant at 0.05 level. It means that there was a significant difference between students with high intrinsic motivation and low intrinsic motivation in oligarchic thinking style. It is evident from table 4.96 that the mean value of low intrinsic higher than high intrinsic group of students ($M = 32.64 > M = 30.53$). From this it may be concluded that low intrinsic motivation students tended to be higher than high intrinsic group of students on oligarchic style of thinking. Hence the hypothesis 5 (a)- 9 was accepted.

Fig 4.12 Significance of difference between mean scores of Oligarchic Style in respect of students with high and low Intrinsic Motivation



HYPOTHESIS 5(a) – 10

There will be significant difference in Anarchic Style of thinking of college students with having high and low levels of intrinsic motivation.

The results of 't' test have been preferred in table 4.97.

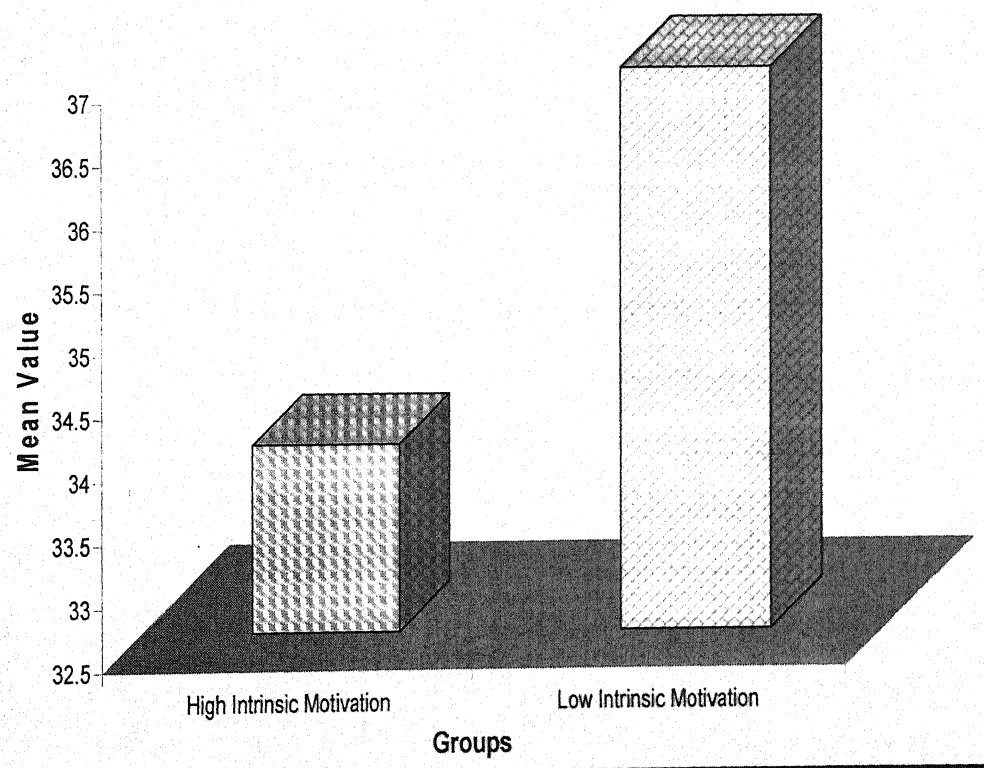
Table 4.97 Significance of difference in mean scores of Anarchic Style in respect of students with High Intrinsic Motivation and Low Intrinsic Motivation

Group	N	Mean	S.D.	df	t	Significance
High Intrinsic Motivation	72	33.99	7.73	134	2.266	*
Low Intrinsic Motivation	64	36.97	7.59			

* significant at 0.05 level

It is apparent from table 4.97 that the 't'-value for anarchic style of thinking came out to be 2.266, which is significant at 0.05 level. It leads to the acceptance of the hypothesis 5(a) - 10. It indicates that there will be significant difference between high intrinsic motivation group of students and low intrinsic group of students on anarchic style of thinking. Furthermore, it is evident from the table that the mean value of low intrinsic motivation students is greater than high intrinsic motivation students (M = 36.97 > M = 33.99). It may be concluded that students with low intrinsic motivation are more prone to anarchic thinking style than students with high intrinsic motivation.

Fig 4.13 Significance of difference between mean scores of Anarchic Style in respect of students with high and low Intrinsic Motivation



HYPOTHESIS 5(a) – 11

There will be significant difference in Global Style of thinking of college students having high and low levels of intrinsic motivation.

The statistics calculated for testing the significance of difference in mean scores of global thinking style given in table 4.98.

Table 4.98 Significance of difference in mean scores of Global Style in respect of students with High Intrinsic Motivation and Low Intrinsic Motivation

Group	N	Mean	S.D.	df	t	Significance
High Intrinsic Motivation	72	33.39	7.30	134	0.719	NS
Low Intrinsic Motivation	64	34.22	6.16			

NS = Not significant at 0.05 level

Table 4.98 shows that the 't'-value came out to be 0.719, which is not significant at 0.05 level. It leads to rejection of the above research hypothesis. In view of the above, it may be stated that there was no significant difference between students with high intrinsic motivation and students with low intrinsic motivation on global style of thinking. In other words both group of students are equally oriented with respect to global style of thinking.

HYPOTHESIS 5(a) – 12

There will be significant difference in Local Style of thinking of college students having high and low levels of intrinsic motivation.

Table 4.99 below shows the result of 't'-test applied to test this hypothesis.

Table 4.99 Significance of difference in mean scores of Local Style in respect of students with High Intrinsic Motivation and Low Intrinsic Motivation

Group	N	Mean	S.D.	df	t	Significance
High Intrinsic Motivation	72	34.86	6.62	134	1.01	NS
Low Intrinsic Motivation	64	32.62	7.58			

NS = Not significant at 0.05 level

Table 4.99 shows that the 't'-value was obtained as 1.01, which is not statistically significant ($p > 0.05$). This led to the rejection of the research hypothesis stating that there will be significant difference in local style of thinking of students with high intrinsic motivation and low intrinsic motivation. It implies that students with high intrinsic motivation and low intrinsic motivation did not differ significantly on local style of thinking.

HYPOTHESIS 5(a) – 13

There will be significant difference in Internal Style of thinking of college students having high and low levels of intrinsic motivation.

The result obtained from 't'-test in this regard have been shown in table 4.100.

Table 4.100 Significance of difference in mean scores of Internal Style in respect of students with High Intrinsic Motivation and Low Intrinsic Motivation

Group	N	Mean	S.D.	df	t	Significance
High Intrinsic Motivation	72	36.03	8.50	134	0.449	NS
Low Intrinsic Motivation	64	35.58	8.16			

NS = Not significant at 0.05 level

It is evident from table 4.100 that the 't'-value was found to be 0.449 which is less than tabled value of 't'. Hence it was not significant ($p > 0.05$). From this it may be concluded that the research hypothesis 5(a)- 13 was rejected. It may be interpreted that there was no significant difference between students with high intrinsic motivation and low intrinsic motivation. Both groups were at par on this thinking style. .

HYPOTHESIS 5(a) – 14

There will be significant difference in External Style of thinking of college students having high and low levels of intrinsic motivation.

Table 4.101 provides the statistics with regard to above-mentioned hypothesis.

Table 4.101 Significance of difference in mean scores of External Style in respect of students with High Intrinsic Motivation and Low Intrinsic Motivation

Group	N	Mean	S.D.	df	t	Significance
High Intrinsic Motivation	72	39.07	8.32	134	0.866	NS
Low Intrinsic Motivation	64	40.3	8.21			

NS = Not significant at 0.05 level

It is clear from the table 4.101 that the obtained 't'-value (0.866) is non-significant ($p > 0.05$). This suggests that there was no significant difference between students having high intrinsic motivation and low intrinsic motivation on external thinking style. Mean value scores however reveals that the mean value (M = 40.3) is higher in favour of low intrinsic motivation group as compared to high intrinsic motivation group (M = 39.07), but it is not statistically significant. Hence the research hypothesis 5 (a)- 14 was rejected.

HYPOTHESIS 5(a) – 15

There will be significant difference in Liberal Style of thinking of college students having high and low levels of intrinsic motivation.

To test the above hypothesis, 't'-test was applied, the results of which is shown in table 4.102.

Table 4.102 Significance of difference in mean scores of Liberal Style in respect of students with High Intrinsic Motivation and Low Intrinsic Motivation

Group	N	Mean	S.D.	df	t	Significance
High Intrinsic Motivation	72	42.11	7.52	134	0.196	NS
Low Intrinsic Motivation	64	42.38	8.44			

NS = Not significant at 0.05 level

It may be seen in table 4.102 that the 't'-value came out to be 0.196, which is non-significant ($p > 0.05$). This leads to the inference that there was no significant difference in liberal style of thinking in respect of students with high intrinsic motivation and low intrinsic motivation. Hence the research hypothesis 5 (a) - 15 was rejected.

HYPOTHESIS 5(a) – 16

There will be significant difference in Conservative Style of college students having high and low levels of intrinsic motivation.

For testing the above hypothesis, 't'-test was performed. The 't' value along with mean of standard deviations are given in table 4.103.

Table 4.103 Significance of difference in mean scores of Conservative Style in respect of students with High Intrinsic Motivation and Low Intrinsic Motivation

Group	N	Mean	S.D.	df	t	Significance
High Intrinsic Motivation	72	32.28	7.10	134	0.559	NS
Low Intrinsic Motivation	64	31.61	6.87			

NS = Not significant at 0.05 level

It may be observed in table 4.103 that the obtained 't'- value (0.559) remained below the desired level of tabled 't-value, hence it was non-significant. From this it may be concluded that the students with high intrinsic motivation did not differ significantly from the students with low intrinsic motivation in conservative style of thinking. Consequently both the groups were alike with regard to conservative style of thinking. Hence the research hypothesis 5 (a) - 16 was rejected.

4.7 THINKING STYLE IN RELATION TO EXTRINSIC MOTIVATION

TESTING HYPOTHESIS - 5(b)

There will be significant differences in thinking styles of college students having high and low levels of extrinsic motivation.

Students possessing high and low extrinsic motivation have been compared on sixteen thinking styles, which have been divided as sub-hypotheses. 't'-test have been performed to test the significance of mean scores of students in case of each sub-hypotheses.

HYPOTHESIS 5(b) – 1

There will be significant difference in Left Hemispheric Style of thinking of college students having high and low levels of extrinsic motivation.

To test this hypothesis, 't'- test was applied. The observed 't' ratio along with means and standard deviations have been shown in table 4.104.

Table 4.104 Significance of difference in mean scores of Left Hemispheric Style in respect of students with High Extrinsic Motivation and Low Extrinsic Motivation

Group	N	Mean	S.D.	df	t	Significance
High Extrinsic Motivation	83	14.06	3.24	139	0.824	NS
Low Extrinsic Motivation	58	13.60	3.28			

NS = Not significant at 0.05 level

Table 4.104 shows that the 't'-value was found to be 0.824, which is not significant ($p > 0.05$). This implies that students with high extrinsic motivation did not differ from students with low extrinsic motivation on left hemispheric style of thinking. Hence the research hypothesis stating that there will be significant difference in Left Hemispheric style of thinking of students with high and low extrinsic motivation was rejected.

HYPOTHESIS 5(b) – 2

There will be significant difference in Right Hemispheric Style of thinking of college students having high and low levels of extrinsic motivation.

For testing this hypothesis, 't'-test was performed, the results of which have been depicted in table 4.105.

Table 4.105 Significance of difference in mean scores of Right Hemispheric Style in respect of students with High Extrinsic Motivation and Low Extrinsic Motivation

Group	N	Mean	S.D.	df	t	Significance
High Extrinsic Motivation	83	12.16	3.93	139	1.292	NS
Low Extrinsic Motivation	58	13.07	4.24			

NS = Not significant at 0.05 level

Table 4.105 exhibits that the 't'-value for the right hemispheric style of thinking as obtained from table 4.105 is 1.292, which is not significant at 0.05 level of significance. It leads to conclude that the hypothesis 5(b) - 2 was rejected. The table however showed that the mean value of low extrinsic motivation group of students was higher than high extrinsic motivation group (M = 13.07 > M = 12.16) but it could not reach the level of significance. It may be attributed due to chance factor and sampling fluctuation. Hence it may be said that both students with high and low extrinsic motivation are alike in this style of thinking.

HYPOTHESIS 5(b) – 3

There will be significant difference in Integrated Hemispheric Style of thinking of college students having high and low levels of extrinsic motivation.

't' test was performed to test the above mentioned research hypothesis. The results for the same have been reported in table 4.106.

Table 4.106 Significance of difference in mean scores of Integrated Hemispheric Style in respect of students with High Extrinsic Motivation and Low Extrinsic Motivation

Group	N	Mean	S.D.	df	t	Significance
High Extrinsic Motivation	83	14.84	4.79	139	1.287	NS
Low Extrinsic Motivation	58	13.76	4.98			

NS = Not significant at 0.05 level

It is clear from the table 4.106 that the 't'- value for integrated hemispheric style was found to be 1.287, which is below the tabled value of significance. It thus implies that the research hypothesis, which states that there will be significant difference in integrated style of thinking of students with high extrinsic motivation and low extrinsic motivation was rejected. Thus it may be inferred that both group of students with high extrinsic motivation and low extrinsic motivation are equally integrated in thinking.

HYPOTHESIS 5(b) – 4

There will be significant difference in Legislative Style of thinking of college students having high and low levels of extrinsic motivation.

Table 4.107 summarizes the results of the 't' test applied to test this hypothesis.

Table 4.107 Significance of difference in mean scores of Legislative Style in respect of students with High Extrinsic Motivation and Low Extrinsic Motivation

Group	N	Mean	S.D.	df	t	Significance
High Extrinsic Motivation	83	41.80	6.50	139	0.450	NS
Low Extrinsic Motivation	58	41.28	6.93			

NS = Not significant at 0.05 level

It is apparent from the table that the observed 't' value as obtained from the table 4.107 (0.450), was non-significant at 0.05 level. It means that there is no significant difference between students with high extrinsic motivation and students with low extrinsic motivation on legislative style. In other words both the group of students with high and low extrinsic motivation is almost equal with respect to their legislative style of thinking. Hence the 1-4 was rejected.

HYPOTHESIS 5(b) – 5

There will be significant difference in Executive Style of thinking of college students having high and low levels of extrinsic motivation.

This hypothesis was tested by 't'-test. The result for the same has been summarized in table 4.108.

Table 4.108 Significance of difference in mean scores of Executive Style in respect of students with High Extrinsic Motivation and Low Extrinsic Motivation

Group	N	Mean	S.D.	df	t	Significance
High Extrinsic Motivation	83	41.24	6.77	139	1.456	NS
Low Extrinsic Motivation	58	42.91	6.65			

NS = Not significant at 0.05 level

It is evident from the table 4.108 that the 't' value came out to be 1.456, which is not significant at 0.05 level. It leads to the rejection of the concerned research hypothesis. In view of the above, it may be stated that there was not significant difference between students with high extrinsic motivation and low extrinsic motivation on executive thinking style. Although mean scores were in favour of students with low extrinsic motivation, it is not statistically significant. It implies that the difference in the two means was not true one and may be ascribed to chance error or sampling fluctuations.

HYPOTHESIS 5(b) – 6

There will be significant difference in Judicial Style of thinking of college students having high and low levels of extrinsic motivation.

The 't'-value calculated for testing this hypothesis is given in table 4.109 along with means and standard deviations.

Table 4.109 Significance of difference in mean scores of Judicial Style in respect of students with High Extrinsic Motivation and Low Extrinsic Motivation

Group	N	Mean	S.D.	df	t	Significance
High Extrinsic Motivation	83	37.64	5.85	139	0.690	NS
Low Extrinsic Motivation	58	38.40	6.82			

NS = Not significant at 0.05 level

Table 4.109 shows that the 't' value for the judicial style came out to be 0.690, which not significant statistically ($p > 0.05$), thereby rejecting the concerned research hypothesis stating that there will significant difference in judicial style of thinking of students with high and low extrinsic motivation.

HYPOTHESIS 5(b) – 7

There will be significant difference in Monarchic Style of thinking of college students having high and low levels of extrinsic motivation.

The statistics calculated for 't' test is given in table 4.110.

Table 4.110 Significance of difference in mean scores of Monarchic Style in respect of students with High Extrinsic Motivation and Low Extrinsic Motivation

Group	N	Mean	S.D.	df	t	Significance
High Extrinsic Motivation	83	34.26	7.77	139	0.741	NS
Low Extrinsic Motivation	58	33.26	7.97			

NS = Not significant at 0.05 level

Table 4.110 shows that the 't' value for testing the significance of difference in mean scores of monarchic style was found to be 0.741, which is not statistically significant ($p > 0.05$). This led to the rejection of hypothesis 5(b)-7. It means that students with high extrinsic motivation did not differ significantly from students with low extrinsic motivation on monarchic style of thinking.

HYPOTHESIS 5(b) – 8

There will be significant difference in Hierarchic Style of thinking of college students having high and low levels of extrinsic motivation.

't' test was applied to calculate the difference in mean scores. The observed 't'-value has been given in table 4.111.

Table 4.111 Significance of difference in mean scores of Hierarchic Style in respect of students with High Extrinsic Motivation and Low Extrinsic Motivation

Group	N	Mean	S.D.	df	t	Significance
High Extrinsic Motivation	83	41.99	7.34	139	1.660	NS
Low Extrinsic Motivation	58	44.14	7.72			

NS = Not significant at 0.05 level

From table 4.111, it may be observed that the obtained 't' value (1.660) seemed below the desired level of tabled 't'-value. Hence it was non significant. From this it may be said that students with high extrinsic motivation and low extrinsic motivation did not show any significant difference in their mean scores of hierarchic style of thinking. Alternatively, it may be stated that both the groups were alike with regard to hierarchic style of thinking. Hence the research hypothesis 5(b)-8 was rejected.

HYPOTHESIS 5(b) – 9

There will be significant difference in Oligarchic Style of thinking of college students having high and low levels of extrinsic motivation.

The statistics calculated for this hypothesis have been reported in table 4.112.

Table 4.112 Significance of difference in mean scores of Oligarchic Style in respect of students with High Extrinsic Motivation and Low Extrinsic Motivation

Group	N	Mean	S.D.	df	t	Significance
High Extrinsic Motivation	83	31.93	6.29	139	0.139	NS
Low Extrinsic Motivation	58	31.78	6.30			

NS = Not significant at 0.05 level

It is evident from the table 4.112 that the 't' value for oligarchic style of thinking came out to be 0.139, which is not significant at 0.05 level of significance. Hence, it leads to the conclusion that the research hypothesis 5(b)-9 was not accepted which stated that there will be significant difference in oligarchic style of thinking of students with high extrinsic motivation and low extrinsic motivation. In other words, both the groups of students were equally oligarchic in their thinking style.

HYPOTHESIS 5(b) – 10

There will be significant difference in Anarchic Style of thinking of college students having high and low levels of extrinsic motivation.

To test the above-mentioned hypothesis, 't'-test was performed, as result this regard have been given in table 4.113.

Table 4.113 Significance of difference in mean scores of Anarchic Style in respect of students with High Extrinsic Motivation and Low Extrinsic Motivation

Group	N	Mean	S.D.	df	t	Significance
High Extrinsic Motivation	83	35.17	7.47	139	0.944	NS
Low Extrinsic Motivation	58	36.40	7.71			

NS = Not significant at 0.05 level

It is clear from the table 4.113 that the 't' value for anarchic thinking style was found to be 0.944, which is too small to be significant at any level ($p > 0.05$). It may thus be inferred that there was no significant difference in anarchic style of thinking in respect of students with high extrinsic motivation and students with low extrinsic motivation. Hence the research hypothesis stating that there will be significant difference in anarchic style of thinking of students with high extrinsic motivation and low extrinsic motivation was rejected.

HYPOTHESIS 5(b) – 11

There will be significant difference in Global Style of thinking of college students having high and low levels of extrinsic motivation.

Table 1.114 below summarizes the statistics with regard to testing of the above hypothesis.

Table 4.114 Significance of difference in mean scores of Global Style in respect of students with High Extrinsic Motivation and Low Extrinsic Motivation

Group	N	Mean	S.D.	df	t	Significance
High Extrinsic Motivation	83	32.76	7.97	139	1.450	NS
Low Extrinsic Motivation	58	34.55	6.64			

NS = Not significant at 0.05 level

As evident from the table 4.114 that the 't' value came out to be 1.450, which is non significant at 0.05 level of confidence. It suggests that there was no significant difference in students with high extrinsic motivation and low extrinsic motivation with respect to their global style of thinking. The mean value of low extrinsic motivation group was greater than the mean value of low extrinsic motivation group (M = 34.55 > M = 32.76) but it could not reach the desired level of significance statistically, hence the research hypothesis 5(b)-11 was rejected.

HYPOTHESIS 5(b) – 12

There will be significant difference in Local Style of thinking of college students having high and low levels of extrinsic motivation.

The summary of 't'-test result has been shown in table 4.115.

Table 4.115 Significance of difference in mean scores of Local Style in respect of students with High Extrinsic Motivation and Low Extrinsic Motivation

Group	N	Mean	S.D.	df	t	Significance
High Extrinsic Motivation	83	35.71	7.43	139	1.037	NS
Low Extrinsic Motivation	58	34.29	8.38			

NS = Not significant at 0.05 level

The 't' value of local style of thinking as reported in table 4.115 is 1.037, which is not significant statistically ($p > 0.05$). From this it may be inferred that the research hypothesis which stated that there will be significant difference in local style of thinking of students with high extrinsic motivation and low extrinsic motivation was rejected. Hence we may conclude that both the group of students with high and low extrinsic motivation were at par in their local thinking style.

HYPOTHESIS 5(b) – 13

There will be significant difference in Internal Style of thinking of college students having high and low levels of extrinsic motivation.

To test the above-mentioned hypothesis, 't'-test was performed, as result this regard have been given in table 4.116

Table 4.116 Significance of difference in mean scores of Internal Style in respect of students with High Extrinsic Motivation and Low Extrinsic Motivation

Group	N	Mean	S.D.	df	t	Significance
High Extrinsic Motivation	83	36.87	8.39	139	1.764	NS
Low Extrinsic Motivation	58	36.31	8.54			

NS = Not significant at 0.05 level

It is apparent from table 4.116 that the 't'-value was found to be 1.764, which is statistically insignificant at 0.05 level, thereby rejecting the research hypothesis 5(b)- 13. It thus leads to conclusion that there was no significant difference between the students with high extrinsic motivation and students with low extrinsic motivation. However the difference in mean scores may be because of the chance error or sampling fluctuation.

HYPOTHESIS 5(b) – 14

There will be significant difference in External Style of thinking of college students having high and low levels of extrinsic motivation.

To test this hypothesis was tested using 't'-test. The results have been summarized in table 4.117.

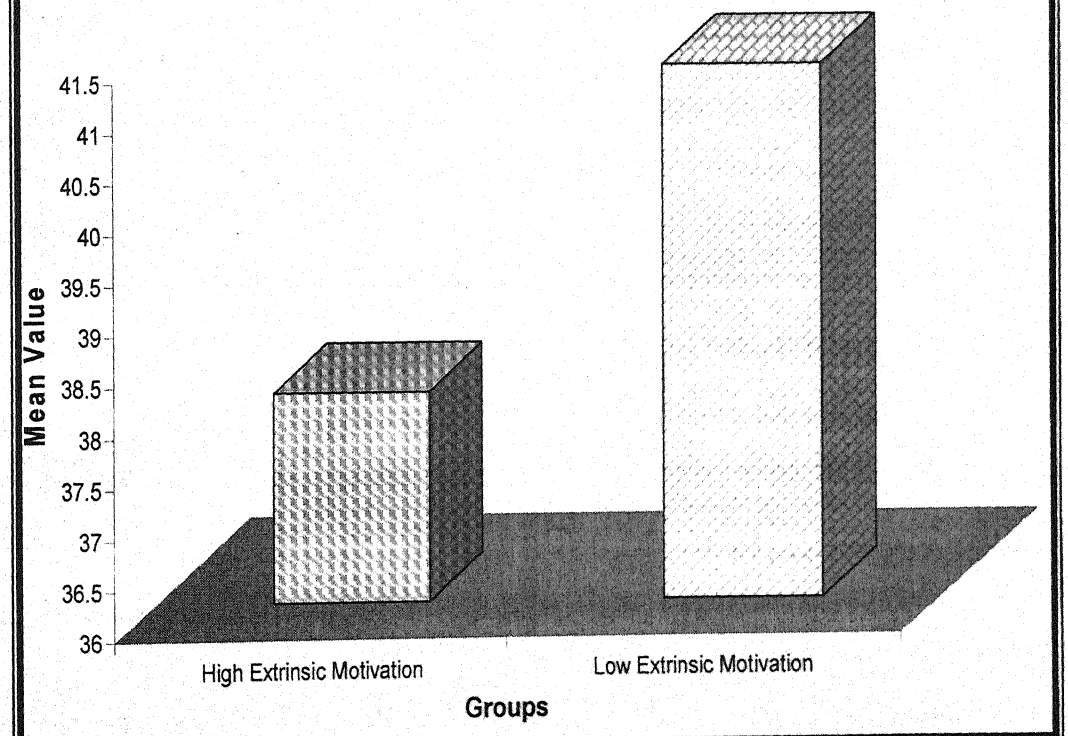
Table 4.117 Significance of difference in mean scores of External Style in respect of students with High Extrinsic Motivation and Low Extrinsic Motivation

Group	N	Mean	S.D.	df	t	Significance
High Extrinsic Motivation	83	38.07	8.15	139	2.189	NS
Low Extrinsic Motivation	58	41.31	8.98			

NS = Not significant at 0.05 level

Table 4.117 exhibits that 't'-value for external style of thinking was observed to be 2.189, which is significant at 0.05 level. It means that there is a significant difference between students with high extrinsic motivation and students with low extrinsic motivation on external style of thinking. It is also evident that the mean value (M = 41.31) was higher in favour of students with low extrinsic motivation than the mean value (M = 38.07) for students with high extrinsic motivation. So it may be concluded that students with low extrinsic motivation are more external in their thinking than students with high extrinsic motivation. Hence the hypothesis 5(b)-14 was accepted.

Fig 4.14 Significance of difference between mean scores of External Style in respect of students with high and low Extrinsic Motivation



HYPOTHESIS 5(b) – 15

There will be significant difference in Liberal Style of thinking of college students having high and low levels of extrinsic motivation.

The statistics calculated for testing the significance of difference in mean scores of liberal thinking style is given in table 4.118.

Table 4.118 Significance of difference in mean scores of Liberal Style in respect of students with High Extrinsic Motivation and Low Extrinsic Motivation

Group	N	Mean	S.D.	df	t	Significance
High Extrinsic Motivation	83	41.24	8.82	139	0.134	NS
Low Extrinsic Motivation	58	41.45	9.37			

NS = Not significant at 0.05 level

Table 4.118 shows that the 't'-value came out to be 0.134, which is not statistically significant ($p > 0.05$).This led to the rejection of the hypothesis 5 (b) - 15. It means that the students with high intrinsic motivation and low extrinsic motivation did not differ significantly in liberal style of thinking. In other words, both the groups are almost equal with respect to liberal thinking style.

HYPOTHESIS 5(b) – 16

There will be significant difference in Conservative Style of thinking of college students having high and low levels of extrinsic motivation.

The obtained in this regard using 't'-test have been presented in table 4.119..

Table 4.119 Significance of difference in mean scores of conservative Style in respect of students with High Extrinsic Motivation and Low Extrinsic Motivation

Group	N	Mean	S.D.	df	t	Significance
High Extrinsic Motivation	83	30.83	7.64	139	0.178	NS
Low Extrinsic Motivation	58	30.60	7.47			

NS = Not significant at 0.05 level

It is evident from the table 4.119 that the 't'-value was obtained as 0.178,which is less than the tabled value of 't'. Hence it was non significant. From this it may be inferred that the research hypothesis 5(b)-16 was rejected. It may be interpreted that there was no significant difference between students with high extrinsic motivation and low extrinsic motivation in conservative thinking style. Both the groups were at par on this thinking style.

4.8 DISCUSSION OF RESULTS

1. Thinking Styles and Academic Achievement:

Analysis of the data indicated that out of 16 styles of thinking only two styles were found to be significantly related to academic achievement of college students. Students having high level of academic achievement tended to adopt the right hemispheric style more than their counterparts having low level of academic achievement. Only one study renders support to this finding. This is the study conducted by **Mc Bartney (1983)** who found that right brain instruction scored significantly higher on language subject of the CTBS. A majority of previous studies conducted in western countries report that right hemispheric style of thinking is significantly related to academic achievement. **(Samples, 1976, Fadley and Hostler 1979, Jarsonbeck, 1984; Okabyashi and Torrence 1984)**. May be high achievers reported higher on right hemispheric style due to their inclination toward creative endeavors.

In another finding high achievers were found superior to low achievers on local style of thinking. This finding is not in agreement with the result of **Sternberg (1997) and Zhang and Sternberg (1998)** who found that local style of thinking was negatively associated with academic achievement. Indian examination system focuses on the study of limited contents. Therefore, Indian learner learns within local framework and does not seem to adopt liberal or global thinking style. Hence the obtained finding seems to be more plausible.

2. Gender and Thinking Styles :

The finding related to gender differences in thinking styles revealed that except one thinking style (Executive) male and female college students did not exhibit significant difference in any thinking style. A number of investigators have reported that male and female students were at par with regard to their thinking styles **(Vats and Raina, 1983; Kreshner and Ledger, 1985; Hebencht et al, 1990; Manfort, 1970, Zhang 1999).** It is quite possible that sex differences remain in thinking styles in adolescents but they start disappearing at college level as a result of similar type of teaching - learning exposures.

3. Stream and Thinking Styles :

Significant differences in some thinking styles of college students due to academic streams were observed in this study. Students belonging to science stream showed more inclination towards the use of left hemispheric style, legislative style, local style and external style of thinking than students belonging to arts and commerce streams. The above-mentioned findings are corroborated by previous studies. For instance science students are found higher on left hemispheric thinking style. The researches of **Lavach (1991), Huang Sisco (1994) and Mishra (1998)** confirm this finding. It is logical also since the nature of contents of science is more prone to left hemispheric style of thinking.

Sood (2003) reported that science students were observed higher on legislative thinking style than arts students and **Sternberg and Grigorenko (1995)** reported that science teachers were more local than humanities teachers. In the present study, science showed more tendency towards the use of external thinking style. This was in disagreement of the result of **Verma (2001)** concluded arts students score higher on external style of thinking than science students.

In this study arts students excelled science/commerce students on right hemispheric style of thinking. This finding is supported by **Lavach (1991) and Mishra (1998).**

4. Personality and Thinking Styles :

The analysis of the data pointed out that college students having introvert and extrovert type personality were found to be significantly different on three thinking styles. Introvert type students were left hemispheric style prone, while extrovert type students were right hemispheric style prone than their counterparts. Similarly, neurotic type students were significantly higher on executive style than stable type students. **Hiller's (1986)** study gives some support to the findings of this study. He found that extroverted people exhibit more right hemispheric style than both normal and introverted persons. **Jackobson's (1993)** study comes on rescue indirectly which concluded that there was positive correlation between innovative style and extraversion type of personality.

However, no study could be traced with reference to comparison of neurotic type and stable type students on executive style of thinking.

5. Motivational Orientation (Intrinsic and Extrinsic) and Thinking Styles :

In the present investigation college students with high and low levels of intrinsic motivation showed significant differences on two thinking styles - oligarchic and anarchic styles of thinking. Students having low level of intrinsic motivation were higher on these thinking style than their counterparts with high intrinsic motivation. Further, students with low level of extrinsic motivation were higher on extrinsic thinking style than students with high level of extrinsic motivation. No empirical study was available to support or oppose the present findings. It warranted that more investigations be conducted to ensure the relationship of thinking styles with intrinsic motivation and extrinsic motivation.

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CHAPTER – V

CONCLUSIONS, IMPLICATIONS AND SUGGESTIONS

CHAPTER - V

CONCLUSIONS, IMPLICATIONS AND SUGGESTIONS

This chapter deals with the conclusions, implications of findings and suggestions for further research in the area of study.

5.1 CONCLUSIONS

The ultimate goal of any scientific research is to arrive at a final answer to the research question with which the investigation was conducted. Conclusions flow from the analysis and interpretation of data. In the words of **Pandey (1983)** conclusions is a kind of 'summing up' or a 'final pronouncement' on the fate of hypotheses tested by the research.

The following conclusions were drawn on the basis of preceding chapter.

5.1.1 THINKING STYLES IN RELATION TO ACADEMIC ACHIEVEMENT

College students differed significantly only on two thinking styles (Right and Local Hemispheric style) in relation to their academic achievement. Low achievers were significantly more right hemispheric oriented than high achievers. Also high achievers had significantly more inclination towards local style of thinking than average and low achievers.

On rest of the thinking styles viz, left hemispheric, integrated, legislative, executive, judicial, monarchic, hierarchic, oligarchic, anarchic, global, internal, external, liberal and conservative no significant differences were found.

5.1.2 THINKING STYLES IN RELATION TO GENDER

Male and female students differed significantly in one thinking style only i.e. executive style. Female students tended to be more executive than male students in their style of thinking.

On remaining styles no significant differences between male and female students were observed. These styles were - left hemispheric, right hemispheric, integrated, legislative, judicial, monarchic, hierarchic, oligarchic, anarchic, global, local, internal, external, liberal and conservative.

5.1.3 THINKING STYLES IN RELATION TO STREAMS

Students belonging to science, arts and commerce streams differed significantly in few styles of thinking. Science students were more left hemispheric dominated, more legislative, more local and more external than students belonging to arts and commerce streams. Arts students were more right hemispheric oriented as compared to science and commerce students.

On rest of thinking styles viz, integrated, executive, judicial, monarchic, hierarchic, oligarchic, anarchic, global, internal, liberal and conservative, no significant differences were found among students of science, arts and commerce streams.

5.1.4 (a) THINKING STYLES IN RELATION TO PERSONALITY TYPE (INTROVERT AND EXTROVERT)

Extrovert and introvert type of students did exhibit significant differences in their two thinking styles only viz, left hemispheric and right hemispheric style. Introvert students were more left hemispheric in their thinking style than extrovert type of students. While extrovert students were more right hemispheric in their thinking styles than introvert students.

On rest of the thinking styles namely - integrated, legislative, executive, judicial, monarchic, hierarchic, oligarchic, anarchic, global, local, internal, external, liberal and conservative no significant differences were observed between students having extrovert and introvert type of personality.

5.1.4 (b) THINKING STYLES IN RELATION TO PERSONALITY TYPE (NEUROTIC AND STABLE)

The neurotic and stable type of students differed significantly in one thinking style i.e. executive style. Neurotic type students were found to be higher executive than stable type of students.

On remaining thinking styles viz, left, hemispheric, right hemispheric, integrated, legislative, judicial, monarchic, hierarchic, oligarchic, anarchic, global, local, internal, external, liberal and conservative no significant differences were found between neurotic and stable type of students.

5.1.5 (a) THINKING STYLES IN RELATION TO INTRINSIC MOTIVATION

College students exhibited significant difference in two thinking styles (oligarchic and anarchic) in relation to intrinsic motivation. Low intrinsic motivation group of students obtained significantly higher mean scores on oligarchic and anarchic styles of thinking in comparison to the high intrinsic motivation group of students.

On the remaining thinking styles i.e. left hemispheric, right .hemispheric, integrated, legislative, executive, judicial, monarchic, hierarchic, global, local, internal, external, liberal and conservative, no differences were found between high and low intrinsically motivated students.

5.1.5 (b) THINKING STYLES IN RELATION TO EXTRINSIC MOTIVATION

College students differed significantly only in one thinking style i.e. external in relation to extrinsic motivation. Low extrinsic motivation group of students tended to be using more external style of thinking than high extrinsic motivation group of students.

On rest. of the thinking styles namely - left hemispheric, right hemispheric, integrated, legislative, executive, judicial, monarchic,

hierarchic, oligarchic, anarchic, global, local, internal, liberal and conservative no differences were observed between high and low intrinsically motivated students.

5.2 EDUCATIONAL IMPLICATIONS OF FINDINGS

On the basis of findings of the study, the following implications may be drawn for higher education.

The findings show that the academic achievement of students is linked with their thinking styles. High achieving students were more local than average and low achieving students. While low achieving students were more prone to right hemispheric style of thinking. Thus it suggests that educational administrators may do some thing to improve the student's achievement by properly diagnosing the factors, which hinders the achievement of students.

Female students were found more executive than male students in their thinking style. This fact may be used by educational planners for various developments.

Stream has vital links with thinking styles of students. Science Students were found more left style oriented, more legislative, more local and more external than arts and commerce students. This underlying fact may be used by educational counselors for guiding the students in proper fields for the proper development of their talent.

Thinking styles also have effect on the extrovert and introvert type of personalities of the students. This fact may thus be considered by the teachers inside and outside classroom situations for modifying the student's personality.

Thinking styles also bear a relationship with neurotic and stable type of students. Neurotic students are found more executive than stable type of students. Psychologists may thus consider this fact for helping the students to improve upon their personalities for overall development.

Thinking style is found to have a vital link with both type of motivation viz, intrinsic motivation and extrinsic motivation. Students with low intrinsic motivation were found to be more oligarchic and anarchic than students with high intrinsic motivation. While students having low extrinsic motivation were found to be more external in their thinking style than the students possessing high extrinsic motivation.

It may thus be inferred that by considering the above facts, intervention strategies may be employed in order to enhance the development of desired thinking styles among college students.

Classroom transactions, curriculum framing, assignment designing may be based on thinking styles of college students so that diversity in thinking styles of college students may be properly exploited for their development.

5.3 SUGGESTIONS FOR FURTHER RESEARCH

After having intensive and extensive experience of conducting the present study, the investigator feels that other researchers may undertake the investigations on the following lines:

1. A study may be designed to investigate their gender differences in thinking styles of college and university students by employing some inventories of thinking styles, which have not been used in the present study.
2. An investigation may be undertaken to explore the relationship of thinking styles of college students by using Cattell's sixteen personality questionnaire.
3. The relationship of thinking styles of college students may be studied with their personality needs.
4. An investigation may be taken up to compare the thinking styles of college students belonging to professional courses.

5. Thinking styles of college students may be studied across different levels of academic achievement.

6. A cross- cultural study may be designed of thinking styles of college students.

7. Thinking styles of college students may be inquired into as a function of intelligence and creativity.

8. A study may be planned to find out the differences in thinking styles of college students in relation to self-concept, self confidence and anxiety levels.

9. A comparative study may be undertaken of thinking styles of college students coming from different disadvantaged sections of the society.

10. A study may be undertaken with a view to find out the differences in thinking styles of intellectually, creativity and academically talented college students.

11. A comparative analysis may be done of thinking styles of well-adjusted and mal- adjusted college students.

12. Thinking styles of college students may be studied in relation to their background factors.

13. The relationship between thinking styles of college students and thinking styles of college teachers may be studied.

14. A study may be designed to investigate the interaction between thinking styles of college students and teaching strategies used at college level.

15. A study may be taken up to explore the relationship between thinking styles of college students and quality of intellective performance.

16. Thinking styles of college students may be studied in relation to level of dogmatism.

17. A Predictive study of thinking styles may be taken up based on gender, culture and inhabitance of college students.

18. Thinking styles of college students may be explored in relation to different types of creativity viz. musical, artistic, linguistic and mathematical.

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SUMMARY

SUMMARY

INTRODUCTION

The World Bank Report *'Knowledge for Development (1999)'* aptly remarks that the developing countries must strengthen the processes of acquiring knowledge, absorbing knowledge and communicating knowledge among their people in order to decrease the information gap between the developing societies and developed societies because in the present day world, knowledge is the most powerful means to development. This is so because in today's world, economies are built not merely through the accumulation of physical capital and human skills, but on foundation of information, learning and adaptation.

Further, the knowledge which is key to growth and development of developing countries depends largely on different types of thinking such as convergent / scientific thinking and divergent / creative thinking and their development. These in turn depend on thinking styles of the individual learners. Thinking styles are preferred ways of exploiting thinking abilities. This way, one may conclude that understanding, development and application of variety of thinking styles of individuals go a long way in all round development of the nation.

Moreover, many of the students we are consigning to the dust heaps of our classrooms, have the abilities to succeed. It is the teachers, not they (students) who are failing. Indeed teachers are failing to recognize the variety of thinking and learning styles they (Students) bring to the classrooms and reaching them in ways that don't fit them. Therefore, **Sternberg (1997)** very rightly suggested the educational implication stemming from the convergent-divergent thinking styles are far reaching. Convergent thinking styles are considered most condusive for sciences, maths and teaching and divergent thinking styles for arts.

Hudson (1966) has found that in general individual with convergent thinking styles prefer formal problems and tasks that are better structural and demand greater logical ability than the more open-ended problems forwarded by divergers. Convergers apparently that we need to take into account student's styles of thinking if we hope to reach them, especially in teaching. Thus situation warrants that investigations be carried out on thinking style of students.

STATEMENT OF THE PROBLEM

In the past several years, there has been extensive research on various approaches to college teaching. But no one approach or method has been found to be consistently superior to all others. However that may only be showing that no one approach is superior for the mythical average students. The more important question is to determine which student learn best under what conditions. An emerging area of research that holds promise in helping us answer this question is student's styles of learning and thinking.

It is amply evident from the foregoing presentations that the research area of styles of thinking is new one particularly for Indian researchers. There are several variables, which need to be investigated in relation to thinking styles of college students. Significant among them are academic achievement, gender, academic discipline/stream, motivation and personality type. The proposed study has been designed to address the following research question –

i. Are there significant differences in styles of thinking of college students having varying levels of academic achievement. i.e. high, average and low?

ii. Are there significant gender differences in the styles of thinking of college students?

iii. Do college students belonging to science, arts and commerce streams exhibit significant differences in their styles of thinking?

iv. Do significant differences exist in styles of thinking of college students having different types of personality?

v. Do college students with high and low levels of Intrinsic' and 'Extrinsic' motivations show significant differences in their styles of thinking?

The above research questions are the integral part of the research problem. Thus the problem of the study was stated as follows:

"A STUDY OF THINKING STYLES OF COLLEGE STUDENTS IN RELATION TO SELECTED COGNITIVE AND NON-COGNITIVE FACTORS"

NEED AND JUSTIFICATION OF THE STUDY

Educators hold that students learn and think in unique individualized ways whether they belong to school, college or university level. Post- secondary education or higher education is becoming increasingly important in every society of developed or developing countries. Particularly a society of people who make mid life career changes or advance their skills or who must work out of necessity or those whose leisure time permit higher education, all contribute to increase demand of higher education through formal or non-formal modes. Therefore the question of how to teach college level students in more effective and efficient ways is becoming pertinent day-by-day.

In search of solution of teaching problems college students, some work has been done on thinking styles of students in foreign countries. But in India no such attempt has been made so far. Hence there is a considerable scope to probe the area styles of thinking of college students in socio-cultural milieu of Indian society.

Thinking styles are very important components of the learning processes of college education. Their understanding is highly desirable if we have to obtain a comprehensive picture of learning processes of college students and to base our teaching efforts on the knowledge of the same in order to inject quality control in educational process.

In view of the above, the need of the proposed study is vividly clear and the study was quite justified to undertake.

OBJECTIVES

The following objectives were realized in the proposed study –

1. To find out the differences in thinking styles of college students in relation to their academic achievement.
2. To Study the differences in thinking styles of college students in relation to their gender.
3. To Study the differences in thinking styles of college students belonging to science, arts and commerce streams.
4. To find out the differences in thinking styles of college students in relation to their personality types.
5. To find out the differences in thinking styles of college students in relation to their motivational orientations.

HYPOTHESES

The following hypotheses have been tested in the proposed study :

1. There will be significant differences in thinking styles of college students having high, average and low levels of academic achievement.
2. There will be significant differences in thinking styles of male and female college students.
3. There will be significant differences in thinking styles of college students belonging to science, arts and commerce streams.

4. There will be significant differences in thinking styles of college students having :

   (a) extrovert type and introvert type personality and

   (b) neurotic type and stable type personality.

5. There will be significant differences in thinking styles of college students having high and low levels of motivational orientations Viz.

   (a) high and low levels of intrinsic motivation and

   (b) high and low levels of extrinsic motivation.

However, for the sake of convenience of testing each hypothesis was into specific hypotheses based on thinking styles.

SCOPE AND DELIMITATIONS

Scope and delimitations of the present study may be understood in terms of the objectives, hypotheses, research method, population sampling, variables, tools, and statistical technique etc.

- The study was delimited in terms of its objectives. These objectives were concerned with determining the differences in thinking styles in relation to college student's cognitive and non-cognitive characteristics.
- Cognitive characteristic was academic achievement and non cognitive characteristics were gender, stream, personality type and motivational orientation.
- The study was concerned with testing of non-directional research hypotheses.
- The study was carried out through descriptive methods of research.
- The population of the study comprised college students of final year studying in science, arts and commerce streams.

- The sample was drawn from the colleges of Jhansi only. It included both - govt. managed and privately managed institutions. The sample included subjects of both sexes.
- Institutions were, selected through random method but the sample was drawn through random cluster sampling technique.
- The study was further delimited in terms of variables. Academic achievement, gender, stream, personality type and motivational orientation (intrinsic and extrinsic) were regarded Independent variables. Thinking styles were treated as Criterion variables.
- The data were collected with the help of Torrance et.al's SOLAT, Sternberg et.al's Thinking Style Inventory, Eysenck's MPI and Ambile et al's Work Preference Inventory. Academic Achievements marks were noted from gazette.
- Subjects were classified by using M ± 1 SD formula on academic achievement, personality type (Extraversion and Neuroticism) and motivation orientation (Intrinsic and Extrinsic).
- The data on criterion variables were analyzed by 't' test and one- way - Analysis of variance technique. Post-hoc analysis was done again by 't' test. Graphs were used to depict differences in mean scores of thinking styles in respect of various groups.
- The study was delimited in terms of time and financial resources also.

DEFINITION OF THE KEY TERMS USED

The key terms which have been used frequently in the present study have been defined here to bring precision and clarity:

Thinking Style: Refers the way one thinks or prefers to think using particular cerebral hemisphere or mental ability.

Left Hemispheric Style : Refers to inclination to use the left cerebral hemisphere in information processing.

Right Hemispheric Style : Refers to inclination to use the right cerebral hemisphere in information processing.

Integrative Style : Refers to inclination to make use of capabilities of both cerebral hemispheres in information processing.

Legislative Style : Person with this style is concerned with creating, formulating imaging and planning; likes to formulate his / her own activities.

Executive Style : Person with this style is concerned with implementing and doing. likes to pursue activities structured by others.

Judicial Style : Person with this style is concerned judging, evaluating and comparing; likes to judge the products of others activities, or to judge the others themselves.

Monarchic Style : Person with this style tends to focus single-mindedly on one goal or need at a time a single goal or way of doing things predominates.

Hierarchic Style : Person tends to allow for multiple goals, each of which may have a different priority; knows how to perform multiple asks within the same time frame, setting priorities for getting them done.

Oligarchic Style : Person with this style tends to allow for multiple all of which are equally important: likes to do multiple tasks the same time frame but has difficulty setting priorities for them done.

Anarchic Style : Person with this style tends to eschew rules, procedures and formal systems; often has difficulty adjusting to school as a system.

Global Style : Person with this style prefers to deal with the large picture and abstractions.

Local Style : Person with this style prefers to deal with details and issues.

Liberal Style : Person with this style likes to do things in new ways, to have change in his / her life, and to defy conventions.

Conservative Style : Person with this style likes traditions and stability; prefers doing things in tried and true ways.

Personality Type : Refers to type of personality based on two dimensions as measured by MPI of Eysenck e.g. extroversive and introversive, neurotic and stable types.

Extrovert (Extroversive) Type : Refers to type of personality, which is least centered around shyness and withdrawal and is more social Introvert (Introversive) Type: Refers to type of personality which is shyness and withdrawal centered.

Neurotic Type : Refers to the general emotional liability of a person, his emotional over responsiveness and his liability to neurotic break down under stress.

Stable Type: Refers to neurotic stability under stress.

Motivation Orientation : Refers to preference for intrinsic and extrinsic motivation as measured by Student Work Preference Inventory of Amabile et al.

Non-Cognitive Characteristic: Refers to academic achievement of students.

Non-Cognitive Characteristic : Refers to gender stream, personality type and motivational orientation.

METHOD OF RESEARCH

The present study's prime concern was to ascertain the differences in thinking styles of college students in relation to achievement, gender, stream, personality type and motivational orientation. Thus the nature of the study required descriptive analysis of existing thinking styles of college students. For this purpose, neither historical, philosophical, case study nor the experimental research was suitable. Only normative survey, under the *descriptive research* could serve the purpose of the present investigation.

POPULATION

The population of this study included all the students studying in III[rd] year of science, arts and commerce in all the colleges of Jhansi city. It included students of government and aided colleges.

SAMPLE

The sample consisted of 371 students. Out of this 193 belong to science, 106 belong to arts and 72 belong to commerce stream. Further 198 students were male and 173 were female.

The sample was drawn by random cluster method. However selection of the institutions was made by random sampling technique.

VARIABLES INVOLVED

In the presented study, two types of variables were considered:

(i) Independent and

(ii) Criterion variables

Independent variables are the conditions or characteristics that the experimenter manipulates or controls in his or her attempt to ascertain their relationship to observe phenomena. In the present study one cognitive characteristics - academic achievement and four non-cognitive characteristics namely gender, stream, personality type and motivational orientation were the independent variables. These were used for classifications of the subjects.

Criterion variables are those characteristics of the learner on which comparisons are made. Under this category sixteen thinking styles were included. Criterion variables are also referred to as dependent variables, which are conditions or characteristics that appear, disappear or change as the experimenter introduces, removes or changes independent variables

TOOLS USED

In the present study the following tools were employed for data collection:

- Your Style of Learning and Thinking (by Torrance et.al.)
- Thinking Style Inventory (by Sternberg and Wagner)
- Maudsley Personality Inventory (M P I) (by Eysenck)
- The Student Work Preference Inventory (by Ambile)

STATISTICAL TECHNIQUES

The data were analyzed by one-way analysis of variance and 't' test. The post hoc analysis in case of significant F-ratio was done by 't' test.

CONCLUSIONS

The following conclusions were drawn in the preceding chapters:

THINKING STYLES IN RELATION TO ACADEMIC ACHIEVEMENT

College students differed significantly only on two thinking styles (Right and Local Hemispheric style) in relation to their academic achievement. Low achievers were significantly more right hemispheric oriented than high achievers. Also high achievers had significantly more inclination towards local style of thinking than average and low achievers.

On rest of the thinking styles viz, left hemispheric, integrated, legislative, executive, judicial, monarchic, hierarchic, oligarchic, anarchic, global, internal, external, liberal and conservative no significant differences were found.

THINKING STYLES IN RELATION TO GENDER

Male and female students differed significantly in one thinking style only i.e. executive style. Female students tended to be more executive than male students in their style of thinking.

On remaining styles no significant differences between male and female students were observed. These styles were - left hemispheric, right hemispheric, integrated, legislative, judicial, monarchic, hierarchic, oligarchic, anarchic, global, local, internal, external, liberal and conservative.

THINKING STYLES IN RELATION TO STREAMS

Students belonging to science, arts and commerce streams differed significantly in few styles of thinking. Science students were more left hemispheric dominated, more legislative, more local and more external than students belonging to arts and commerce streams. Arts students were more right hemispheric oriented as compared to science and commerce students.

On rest of thinking styles viz, integrated, executive, judicial, monarchic, hierarchic, oligarchic, anarchic, global, internal, liberal and conservative, no significant differences were found among students of science, arts and commerce streams.

THINKING STYLES IN RELATION TO PERSONALITY TYPE (INTROVERT AND EXTROVERT)

Extrovert and introvert type of students did exhibit significant differences in their two thinking styles only viz, left hemispheric and right hemispheric style. Introvert students were more left hemispheric in their thinking style than extrovert type of students. While extrovert students were more right hemispheric in their thinking styles than introvert students.

On rest of the thinking styles namely - integrated, legislative, executive, judicial, monarchic, hierarchic, oligarchic, anarchic, global, local, internal, external, liberal and conservative no significant differences were observed between students having extrovert and introvert type of personality.

THINKING STYLES IN RELATION TO PERSONALITY TYPE (NEUROTIC AND STABLE)

The neurotic and stable type of students differed significantly in one thinking style i.e. executive style. Neurotic type students were found to be higher executive than stable type of students.

On remaining thinking styles viz, left, hemispheric, right hemispheric, integrated, legislative, judicial, monarchic, hierarchic, oligarchic, anarchic, global, local, internal, external, liberal and conservative no significant differences were found between neurotic and stable type of students.

THINKING STYLES IN RELATION TO INTRINSIC MOTIVATION

College students exhibited significant difference in two thinking styles (oligarchic and anarchic) in relation to intrinsic motivation. Low intrinsic motivation group of students obtained significantly higher mean scores on oligarchic and anarchic styles of thinking in comparison to the high intrinsic motivation group of students.

On the remaining thinking styles i.e. left hemispheric, right .hemispheric, integrated, legislative, executive, judicial, monarchic, hierarchic, global, local, internal, external, liberal and conservative, no differences were found between high and low intrinsically motivated students.

THINKING STYLES IN RELATION TO EXTRINSIC MOTIVATION

College students differed significantly only in one thinking style i.e. external in relation to extrinsic motivation. Low extrinsic motivation group of students tended to be using more external style of thinking than high extrinsic motivation group of students.

On rest. of the thinking styles namely - left hemispheric, right hemispheric, integrated, legislative, executive, judicial, monarchic,

hierarchic, oligarchic, anarchic, global, local, internal, liberal and conservative no differences were observed between high and low intrinsically motivated students.

EDUCATIONAL IMPLICATIONS OF FINDINGS

On the basis of findings of the study, the following implications may be drawn for higher education.

The findings show that the academic achievement of students is linked with their thinking styles. High achieving students were more local than average and low achieving students. While low achieving students were more prone to right hemispheric style of thinking. Thus it suggests that educational administrators may do some thing to improve the student's achievement by properly diagnosing the factors, which hinders the achievement of students.

Female students were found more executive than male students in their thinking style.. This fact may be used by educational planners for various developments.

Stream has vital links with thinking styles of students. Science students were found more left style oriented, more legislative, more local and more external than arts and commerce students. This underlying fact may be used by educational counselors for guiding the students in proper fields for the proper development of their talent.

Thinking styles also have effect on the extrovert and introvert type of personalities of the students. This fact may thus be considered by the teachers inside and outside classroom situations for modifying the student's personality.

Thinking styles also bear a relationship with neurotic and stable type of students. Neurotic students are found more executive than stable type of students. Psychologists may thus consider this fact for helping the students to improve upon their personalities for overall development.

Thinking style is found to have a vital link with both type of motivation viz, intrinsic motivation and extrinsic motivation. Students with low intrinsic motivation were found to be more oligarchic and anarchic than students with high intrinsic motivation. While students having low extrinsic motivation were found to be more external in their thinking style than the students possessing high extrinsic motivation.

It may thus be inferred that by considering the above facts, intervention strategies may be employed in order to enhance the development of desired thinking styles among college students.

Classroom transactions, curriculum framing, assignment designing may be based on thinking styles of college students so that diversity in thinking styles of college students may be properly exploited for their development.

SUGGESTIONS FOR FURTHER RESEARCH

After having intensive and extensive experience of conducting the present study, the investigator feels that other researchers may undertake the investigations on the following lines:

1. A study may be designed to investigate their gender differences in thinking styles of college and university students by employing some inventories of thinking styles, which have not been used in the present study.
2. An investigation may be undertaken to explore the relationship of thinking styles of college students by using Cattell's sixteen personality questionnaire.
3. The relationship of thinking styles of college students may be studied with their personality needs.
4. An investigation may be taken up to compare the thinking styles of college students belonging to professional courses.

5. Thinking styles of college students may be studied across different levels of academic achievement.
6. A cross- cultural study may be designed of thinking styles of college students.
7. Thinking styles of college students may be inquired into as a function of intelligence and creativity.
8. A study may be planned to find out the differences in thinking styles of college students in relation to self- concept, self confidence and anxiety levels.
9. A comparative study may be undertaken of thinking styles of college students coming from different disadvantaged sections of the society.
10. A study may be undertaken with a view to find out the differences in thinking styles of intellectually, creativity and academically talented college students.
11. A comparative analysis may be done of thinking styles of well-adjusted and mal- adjusted college students.
12. Thinking styles of college students may be studied in relation to their background factors.
13. The relationship between thinking styles of college students and thinking styles of college teachers may be studied.
14. A study may be designed to investigate the interaction between thinking styles of college students and teaching strategies used at college level.
15. A study may be taken up to explore the relationship between thinking styles of college students and quality of intellective performance.

16. Thinking styles of college students may be studied in relation to level of dogmatism.

17. A Predictive study of thinking styles may be taken up based on gender, culture and inhabitance of college students.

18. Thinking styles of college students may be explored in relation to different types of creativity viz. musical, artistic, linguistic and mathematical.

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APPENDICES

YOUR STYLE OF LEARNING AND THINKING
(Form B)

Instructions:—People differ in their preferred ways of learning and thinking. On the answer sheet provided, describe your style of learning and thinking by blackening the appropriate blanks. In each item, three different styles of learning or thinking are described. Select the one that describes most accurately your strength or preference.

1. (a) not good at remembering faces
   (b) not good at remembering names
   (c) equally good at remembering names and faces

2. (a) respond best to verbal instructions
   (b) respond best to instruction by example
   (c) equally responsive to verbal instruction and instruction by example

3. (a) able to express feelings and emotions freely
   (b) controlled in expression of feelings and emotions
   (c) inhibited in expression of feelings and emotions

4. (a) playful and loose in experimenting (in sports, art, extra-curricular activities, etc.)
   (b) systematic and controlled in experimenting
   (c) equal preference for playful/loose and systematic/controlled ways of experimenting

5. (a) prefer classes where I have one assignment at a time
   (b) prefer classes where I am studying or working on many things at once
   (c) I have equal preference for the above type classes

6. (a) preference for multiple-choice tests
   (b) preference for essay tests
   (c) equal preference for multiple-choice and essay tests

7. (a) good at interpreting body language or the tone aspect of verbal communication
   (b) poor at interpreting body language; dependent upon what people say
   (c) equally good at interpreting body language and verbal expression

8. (a) good at thinking up funny things to say and/or do
   (b) poor at thinking up funny things to say and/or do
   (c) moderately good at thinking up funny things to say or do

9. (a) prefer classes in which I am moving and doing things
   (b) prefer classes in which I listen to others
   (c) equal preference for classes in which I am moving and doing things and those in which I listen

10. (a) use factual, objective information in making judgments
    (b) use personal experiences and feelings in making judgments
    (c) make equal use of factual, objective information and personal experiences/feelings in making judgments

11. (a) playful approach in solving problems
    (b) serious, all-business approach to solving problems
    (c) combination of playful and serious approach in solving problems

12. (a) mentally receptive and responsive to sounds and images more than to people
    (b) essentially self acting and creative mentally with groups of other people
    (c) equally receptive and self acting mentally regardless of setting

13. (a) almost always am able to use freely whatever is available to get work done
    (b) at times am able to use whatever is available to get work done
    (c) prefer working with proper materials, using things for what they are intended to be used for

14. (a) like for my classes or work to be planned and know exactly what I am supposed to do
    (b) like for my classes or work to be open with opportunities for flexibility and change as I go along
    (c) equal preference for classes and work that is planned and those that are open to change

15. (a) very inventive
    (b) occasionally inventive
    (c) think best while working or moving about

16. (a) think best while lying flat on back
    (b) think best while sitting upright
    (c) think best while working or moving about

17. (a) like classes where the work has clear and immediate applications (e.g., mechanical drawing, shop, home economics)
    (b) like classes where the work does not have a clearly practical application (literature, Algebra, history)
    (c) equal preference for the above type of classes

18. (a) like to play hunches and make guesses when I am unsure about things
    (b) rather not guess or play a hunch when in doubt
    (c) play hunches and make guesses in some situations

19. (a) like to express feelings and ideas in plain language
    (b) like to express feelings and ideas in poetry, song, dance, etc.
    (c) equal preference for expressing feelings and ideas in plain language or in poetry, song, dance, etc.

20. (a) usually get many new insights from poetry, symbols, etc.
    (b) occasionally get new insights from poetry, symbols, etc.
    (c) rarely ever get new insights from poetry, symbols, etc.

21. (a) preference for simple problems
    (b) preference for complex problems
    (c) equal preference for simple and complex problems

22. (a) responsive to emotional appeals
    (b) responsive to logical, verbal appeals
    (c) equally responsive to emotional and verbal appeals

23. (a) preference for dealing with one problem at a time
    (b) preference for dealing with several problems at a time
    (c) equal preference for dealing with problems sequentially or simultaneously

24. (a) prefer to learn the well established parts of a subject
    (b) prefer to deal with theory and speculations about new subject matter
    (c) prefer to have equal parts of the two above approaches to learning

25. (a) preference for critical and analytical reading as for a book review, criticism of a movie, etc.
    (b) preference for creative, synthesizing reading as for making applications and using information to solve problems
    (c) equal preference for critical and creative reading

26. (a) preference for intuitive approach in solving problems
    (b) preference for logical approach to solving problems
    (c) equal preference for logical approaches to solving problems

27. (a) prefer use of visualization and imagery in problem solving
    (b) prefer language and analysis of a problem in order to find solutions
    (c) no preference for either method

28. (a) preference for solving problems logically
    (b) preference for solving problems through experience
    (c) equal preference for solving problems logically or through experience

29. (a) skilled in giving verbal explanations
    (b) skilled in showing by movement and action
    (c) equally able to give verbal explanations and explanations by action and movement

30. (a) learn best from teaching which uses verbal explanation
    (b) learn best from teaching which uses visual presentation
    (c) equal preference for verbal explanation and visual presentation

31. (a) primary reliance on language in remembering and thinking
    (b) primary reliance on images in remembering and thinking
    (c) equal reliance on language and images

32. (a) preference for analyzing something that has already been completed
    (b) preference for organizing and completing something that is unfinished
    (c) no real preference for either activity

33. (a) enjoyment of talking and writing
    (b) enjoyment of drawing or manipulating objects
    (c) enjoyment of both talking/writing and drawing/manipulating

34. (a) easily lost even in familiar surroundings
(b) easily find directions even in strange surroundings
(c) moderately skilled in finding directions

35. (a) more creative than intellectual
(b) more intellectual than creative
(c) equally creative and intellectual

36. (a) like to be in noisy, crowded places where lots of things are happening at one
(b) like to be in a place where I can concentrate on one activity to the best of my ability
(c) sometimes like both of the above and no real preference for one over the other

37. (a) primary outside interests are aesthetically oriented, that is, artistic, musical, dance, etc.
(b) primary outside interests are primarily practical and applied, that is, working, scouts, team sports, cheerleading, etc.
(c) participate equally in the above two types of activities

38. (a) vocational interests are primarily in the general areas of business, economics, and the hard sciences, i.e., chemistry, biology, physics, etc.
(b) vocational interests are primarily in the general areas of the humanities and soft sciences, i.e., history, sociology, psychology, etc.
(c) am undecided or have no preference at this time

39. (a) prefer to learn details and specific facts
(b) prefer a general overview of a subject, i.e., look at the whole picture
(c) prefer overview intermixed with specific facts and details

40. (a) mentally receptive and responsive to what hand hear read
(b) mentally searching, questioning, and self-initiating in learning
(c) equally receptive/responsive and searching/self-initiating

ANSWER SHEET

YOUR STYLE OF LEARNING AND THINKING

(Please fill in)

Name _____ Father's Name _____

Sex _____ Class _____ Class No. _____ Exam. Roll No. _____

Subject _____ Stream (Science/Arts/Commerce) Please tick one.

Do you belong to Village or City ?. _____

Note:- Answer by way of encircling one of the choices given against each question number which indicates your response.

Q.No.	Answer		
1.	a	b	c
2.	a	b	c
3.	a	b	c
4.	a	b	c
5.	a	b	c
6.	a	b	c
7.	a	b	c
8.	a	b	c
9.	a	b	c
10.	a	b	c
11.	a	b	c
12.	a	b	c
13.	a	b	c
14.	a	b	c
15.	a	b	c
16.	a	b	c
17.	a	b	c
18.	a	b	c
19.	a	b	c
20.	a	b	c
21.	a	b	c
22.	a	b	c
23.	a	b	c
24.	a	b	c
25.	a	b	c
26.	a	b	c
27.	a	b	c
28.	a	b	c
29.	a	b	c
30.	a	b	c
31.	a	b	c
32.	a	b	c
33.	a	b	c
34.	a	b	c
35.	a	b	c
36.	a	b	c
37.	a	b	c
38.	a	b	c
39.	a	b	c
40.	a	b	c

APPENDIX – A-2

THINKING STYLE INVENTORY

Please fill in :

Name_____ Sex_____ Class_____

Stream_____

Permanent Residence (City or Village ?) Please tick (✓).

Name of Institution _____

Directions:-

- Read each statement carefully and decide how well it describes you. Use the scale provided to indicate how well the statement fits the way you typically do things on the job, at home, or at school.
- Write 1 if the statement does not fit you at all, that you at more never do the things this way. Write 7 if the statement fits you extremely well that is, you almost always do things this way. Use the values in between to indicate that statement fits you in varying degrees: 1 = Not at all well, 2 = Not very well 3 = slightly well 4 = some what well 5 = well 6 = Very well 7 = extremely well.
- **There are of course no right or wrong answers.** Please read each statement and write next to statements the scale number that best indicates how well the statement describes you. Proceed at your own pace, but do not spend too much time on anyone statement.

S.No	STATEMENT	Scale No.
1.	When making decisions, I tend to rely on my own ideas and way of doing things.	
2.	When faced with a problem, I use my own ideas and strategies to solve it.	
3.	I like to play with my ideas and see how far they go.	
4.	I like problems where I can try my own way of solving them.	
5.	When working on a task, I like to start with my own ideas.	
6.	Before starting a task, I like to figure out for myself how I will do my work.	
7.	I feel happier about a job when I can decide for my self and how to do it.	
8.	I like situations where I can use my own ideas and ways of doing things.	
9.	When discussing or writing down ideas, I follow formal rules of presentation.	
10.	I am careful to use the proper method to solve any problem.	
11.	I like project that have a clear structure and set plan and goal.	
12.	Before starting a task or project I check to see what method or procedure should be used.	
13.	I like situations in which my role or the way I participate is clearly defined.	
14.	I like to figure out how to solve a problem following certain rules.	

15.	I enjoy working on things that I can do by following directions.	
16.	I like to follow definite rules or directions when solving a problem or doing a task.	
17.	When discussing or writing down ideas, I like criticizing other's way of doing things.	
18.	When faced with opposing ideas, I like to decide which is the right way to do something.	
19.	I like to check and rate opposing points of view or conflicting ideas.	
20.	I like projects where I can study and rate different views and ideas.	
21.	I prefer tasks or problems where I can grade the design or methods of others.	
22.	When making a decision, I like to compare the opposing points of view.	
23.	I like situations where I can compare and rate different ways of doing things.	
24.	I enjoy work that involves analysing, grading or comparing things.	
25.	When talking and writing ideas, I stick to one main idea.	
26.	I like to deal with major issues or themes rather than details or facts.	
27.	When trying to finish a task I tend to ignore problems that come up.	
28.	I use any means to reach my goal.	
29.	When trying to make a decision I tend to see only one major factor.	
30.	If there are several important things to do, I do the one most important to me.	
31.	I like to concentrate on one task at a time.	
32.	I have to finish one project before starting another one.	
33.	I like to set priorities for the things I need to do before I start doing them.	
34.	When talking or writing down ideas, I like to have the issues organised in order of importance.	
35.	Before starting a project, I like to know the things I have to do and in what order.	
36.	In dealing with difficulties, I have a good sense of how important each of them is and what order to tackle them in.	
37.	When there are many things to do I have clear sense of the order in which to do that.	
38.	When starting something, I like to make a list of things to do and to order the things by importance.	
39.	When working on a task, I can see how the parts relate to the overall goal of the task.	
40.	When discussing or writing down ideas I stress the main idea and how everything fits together.	
41.	When I undertake some task. I am usually open to starting by working on any of several things.	
42.	When there are competing issues of importance to address in my work, I some how try to address them simultaneously.	
43.	Usually, when I have many things to do, I split my time and attention equally among them.	
44.	I try to have several things going on at once, so that I can shift back and forth between them.	
45.	Usually I do several things at once.	

46.	I sometimes have trouble setting priorities for multiple things that I need to get done.	
47.	I usually know what things need to be done, but I sometimes have trouble deciding in what order to do them.	
48.	Usually when working on a project, I tend to view almost all aspects of it as equally important.	
49.	When I have many things to do, I do whatever occurs to me first.	
50.	I can switch from one task to another easily, because all tasks seem to me equally important.	
51.	I like to tackle all kinds of problems even seemingly trivial ones.	
52.	When discussing or writing down ideas, I use whatever comes to mind.	
53.	I find that solving one problem usually leads to many other ones, that are just as important.	
54.	When trying to make a decision, I tried to take all points of view into account.	
55.	When there are many important things to do, I tried to do as many as I can do whatever time I have.	
56.	When I start on a task I liked to consider all possible ways of doing it, even the most ridiculous.	
57.	I like situations or tasks in which I am not concerned with details.	
58.	I care more about the general effect than about the details of the tasks I have to do.	
59.	In doing a task, I like to see how what I do fits into the general picture.	
60.	I tend to emphasis the general aspect of issues or the overall effect of a project.	
61.	I like situations where I can focus on general issues rather than on specifics.	
62.	In talking or writing down ideas, I like to show the scope and context of my ideas, i.e. the general picture.	
63.	I tend to pay little attention to details.	
64.	I like working on projects that deal with general issues and not with nitty-gitty details.	
65.	I prefer to deal with specific problems rather than with general questions.	
66.	I prefer tasks dealing with a single, concrete problem rather than general or multiple ones.	
67.	I tend to break down a problem into many smaller ones that I can solve, without looking at the problem as a whole.	
68.	I like to collect detailed or specific information for projects I work on.	
69.	I like problems where I need to pay attention to detail.	
70.	I pay more attention to the parts of a task then to its overall effect or significance.	
71.	In discussing or writing on a topic, I think the details and facts are more important than overall picture.	
72.	I like to memorise facts and bits of information without any particular content.	
73.	I like to control all phases of a project, without having to consult others.	
74.	When time to make a decision, I rely on my own judgement of the situation.	
75.	I prefer situation where I can carry my own ideas, without relying on others.	

APPENDIX – A-3

Hindi Version of H. J. Eysenck's M. P. I.

PREPARED BY S. JALOTA and S. D. KAPOOR

मॉर्ड्सले की व्यक्तित्व परीक्षा

नाम..... स्त्री/पुरुष आयु.....वर्ष.....मास

स्कूल/कालेज/दफ्तर.....

तारीख ..... पिता या अभिभावक या आपकी मासिक आय : रु०..... .....

व्यवसाय/पेशा/धन्धा .....

इस प्रश्नावली में आपके व्यवहार, भाव, कार्य आदि से सम्बधित कुछ प्रश्न पूछे गए हैं। इन प्रश्नों के लिए कोई भी पूर्वनिश्चित "या "गलत" उत्तर नहीं हो सकते हैं। क्योंकि एक ही परिस्थिति में यदि एक आदमी को एक तरह का अनुभव होता है तो दूसरे को तरह का अनुभव हो सकता है। अतः आपको जो सही लगे वही आपके लिए ठीक उत्तर है। आप के लिए नीचे दिए हुए उदाहरण स्वयं समझ जायेंगे, जिसे आप मन में पढ़िए।

क्या आपको गप-शप करना बहुत पसंद है ?..... हां ☐ ? ☐ नहीं ☐

जैसा कि आप देखते हैं कि हरेक प्रश्न के तीन सम्भावित उत्तर दिए गए हैं : "हां ☐", "? ☐", तथा "नही ☐"। आपको देते समय कुछ लिखना नहीं है, केवल प्रश्नों को पढ़ कर यह निश्चित करना है कि "हां ☐" और "नही ☐" मे से कौन सा उत्तर भाव अथवा कार्य को सही-सही प्रकट करता है और उसके बाद उक्त प्रश्न के सामने दिए हुए खानों में से एक खाने में सही (√) निशान बनाना है। अधिकांश अवस्थाओं में आपका उत्तर "हां" और "नहीं" में होना चाहिए। पर यदि आप बिल्कुल निश्चित न कर सकें तो "?" के साथ वाले खाने (Box) में निशान लगा सकते हैं। जहां तक हो सके यदि आप गलत खाने में निशान लगा दें, तो उसे पर काट कर ठीक स्थान पर निशान लगाएं। प्रश्नों का उत्तर देने में शीघ्रता करें, बहुत अधिक सोच विचार करें, बल्कि तुरन्त मन में आए विचार या उत्तर को उसी समय निशान लगा दीजिये। किसी भी प्रश्न को मत छोड़िए, बल्कि प्रश्न का कुछ न कुछ उत्तर अवश्य दीजिए। साधारणतया कोई व्यक्ति पन्द्रह मिनट में अधिकतर लोग समाप्त कर लेते हैं। आप से आरम्भ करके सारे प्रश्नों का उत्तर दे डालिए।

अब आप शुरू कर दीजिए। ★

यदि किसी एक काम में बहुत जल्दी की जरूरत हो तो क्या उसे करने में आपको सबसे ज्यादा खुशी होती है ?	हां ☐	? ☐	नहीं ☐
क्या आपको अक्सर ऐसा भी लगता है कि आप बिना किसी वजह के ही अपने को कभी तो उत्साह और कभी प्रसन्न पाते है ?	हां ☐	? ☐	नहीं ☐
जब कभी आप किसी बात पर मन लगाने की कोशिश करते हैं तो क्या आपका मन अक्सर विचल होने लगता है ?	हां ☐	? ☐	नहीं ☐
नए दोस्त बनाने में क्या आप अक्सर खुद कोशिश करते है ?.....	हां ☐	? ☐	नहीं ☐
क्या आप अपने कार्यों को जल्दी और निश्चय के साथ करना चाहते हैं ?.....	हां ☐	? ☐	नहीं ☐
क्या आप किसी के साथ बाते करते-करते कुछ सोचने लग जाते हैं ?.....	हां ☐	? ☐	नही ☐
क्या आप में कार्य करने की शक्ति कभी तो बहुत तेज और कभी बहुत कम हो जाती है ?.....	हां ☐	? ☐	नही ☐
क्या आप अपने को जिन्दा-दिल समझते हैं	हां ☐	? ☐	नही ☐
यदि आपको समाज में मिलने-जुलने से रोक दिया जाए तो क्या आप दुःखी होंगे ?.....	हां ☐	? ☐	नहीं ☐
क्या आपके मिजाज में अक्सर उतार-चढ़ाव होता रहता है ?.....	हां ☐	? ☐	नही ☐
क्या आपका स्वभाव बिना किसी वजह के ही बदलता रहता है ?.....	हां ☐	? ☐	नहीं ☐
क्या आप किसी कार्य की योजना बनाने के बजाय उसे कर ही डालना पसन्द करते है ?	हां ☐	? ☐	नहीं ☐

★

Total of Short Scale : N ☐ L ☐

★

१३.	क्या आप ऐसी बातों की कल्पना करते रहते हैं जो कभी पूरी हो न ?	.....हां ☐	? ☐	नहीं ☐
१४.	क्या सामाजिक अवसरों पर (सभा, सोसायटी आदि में) आप पीछे र जाते हैं ?	.....हां ☐	? ☐	नहीं ☐
१५.	क्या आप अपनी बीती बातों पर अक्सर सोचा करते हैं ?	.....हां ☐	? ☐	नहीं ☐
१६.	क्या आपको एक खुशनुमा पार्टी में घुल-मिल जाने में मुश्किल होती ?	..... हां ☐	? ☐	नहीं ☐
१७.	क्या आप बिना किसी वजह के ही अपने को अक्सर दुखी महसूस कर हैं ?	.....हां ☐	? ☐	नहीं ☐
१८.	क्या आप जरूरत से ज्यादा सावधान रहते हैं ?.....	.....हां ☐	? ☐	नहीं ☐
१९.	क्या आपको अक्सर ऐसा लगता है कि आपने किसी बात को प करने जहुत देर लगा दी है ?.....	.....हां ☐	? ☐	नहीं ☐
२०.	क्या आप लोगों से मिलना पसन्द करते हैं ?	.....हां ☐	? ☐	नहीं ☐
२१.	क्या आपको अक्सर चिन्ता के कारण नींद नहीं आती ?.....	.....हां ☐	? ☐	नहीं ☐
२२.	क्या आप अपनी जान-पहचान गिने-चुने लोगों तक ही सीमित रखना पंद करते ?	.....हां ☐	? ☐	नहीं ☐
२३.	क्या आप अक्सर किन्हीं पाप या अपराध की भावनाओं से परेशान रह हैं ?.....	.....हां ☐	? ☐	नहीं ☐
२४.	क्या आप अपने काम को अक्सर बहुत मन लगाकर (गम्भीरता से) क ते हैं ?.....	.....हां ☐	? ☐	नहीं ☐
२५.	क्या आप छोटी-छोटी बातों पर बुरा महसूस करते हैं ?.....	..... हां ☐	? ☐	नहीं ☐
२६.	क्या आप बहुत सी सभा-सोसायटियों में जाना पसंद करते हैं ?.....	.....हां ☐	? ☐	नहीं ☐
२७.	क्या आप अपने को बहुत ही बेचैन व्यक्ति समझते हैं ?.....	..... हां ☐	? ☐	नहीं ☐
२८.	क्या आप किसी टीम या दलों में काम करते समय नेता (लीडर) बनना पसंद करते ?..	.....हां ☐	? ☐	नहीं ☐
२९.	क्या आप अक्सर अपने को अकेलापन महसूस करते हैं ?.....	..... हां ☐	? ☐	नहीं ☐
३०.	भिन्न लिंग वाले व्यक्तियों (मर्द या औरत) के सामने क्या आपको श लगती है	.....हां ☐	? ☐	नहीं ☐
३१.	क्या आप सपनों की दुनिया में रहना ज्यादा पसंद करते हैं ?.....	..... हां ☐	? ☐	नहीं ☐
३२	आपसे कोई बात कही जाने पर क्या आप उसका जवाब तुरन्त दे देते ?.....	.....हां ☐	? ☐	नहीं ☐
३३.	क्या आप अपनी पिछली खुशी की बातों पर विचार करने में अधिक स य लगाते हैं	..... हां ☐	? ☐	नहीं ☐
३४.	क्या आप अपने को खुश-मिजाज समझते हैं ?.....	.....हां ☐	? ☐	नहीं ☐
३५.	क्या आपने अक्सर अपने को बिना कारण उदासीन या थका हुआ म ूस किया ?.....	.....हां ☐	? ☐	नहीं ☐
३६.	क्या आप सामाजिक-मंडली में चुप रहना पसंद करते हैं ?	.....हां ☐	? ☐	नहीं ☐
३७.	किसी कठिनाई को पार कर लेने के बाद क्या आप अक्सर यह सोचते है कि आपने वह नहीं किया जो आपको करना चाहिए था ?.....	.....हां ☐	? ☐	नहीं ☐
३८.	क्या सैर-सपाटे के वक्त आप खूब आनन्द उठा सकते हैं ?	.....हां ☐	? ☐	नहीं ☐
३९.	क्या आपके मन में इतने विचार आते हैं कि आप सो नहीं सकते ? ..	.....हां ☐	? ☐	नहीं ☐
४०.	क्या आप ऐसा काम पसन्द करते हैं जिसमें अधिक ध्यान लगाना पड़ता है ?.....	.....हां ☐	? ☐	नहीं ☐
४१.	क्या कभी आपको किसी बार-बार आए हुए बेकार के विचार ने परेश किया है ?	.....हां ☐	? ☐	नहीं ☐
४२.	क्या आप अपने कामों को अक्सर लापरवाही से करते हैं ?	.....हां ☐	? ☐	नहीं ☐
४३.	क्या आपको अक्सर मामलों की छोटी-छोटी बातें परेशान कर देती ?.....	.....हां ☐	? ☐	नहीं ☐
४४.	क्या दूसरे लोग आपको एक मस्त व्यक्ति समझते हैं ?.....	..... हां ☐	? ☐	नहीं ☐
४५.	क्या आप अक्सर निराश या दुखी रहते हैं ?	.....हां ☐	? ☐	नहीं ☐
४६.	क्या आप अपने को बहुत बातूनी मानते हैं ?.....	.....हां ☐	? ☐	नहीं ☐
४७.	क्या आपको कभी इतनी परेशानी होती है कि आप देर तक कुर्सी पर ही बैठ सकें ?	.....हां ☐	? ☐	नहीं ☐
४८.	क्या आप दूसरों का मजाक उड़ाना पसन्द करते हैं ?.....	.....हां ☐	? ☐	नहीं ☐

★

Total of Long or Full Scale	N	E
Raw Scores		
Standard Scores		

APPENDIX – A-4

THE STUDENT WORK PREFERENCE (MOTIVATIONAL ORIENTATION) INVENTORY

Please Fill in)

Name_____ Father's Name_____

Sex_____ Class_____ Subject_____

Class Roll No_____ Exam Roll No_____

Directions:

Read each statement carefully and think to what extent it applies in your case. Respond to each item by circling one of the numbers given against each statement.

Remember

represent Never True of me
" Seldom True of me
" Most often True of me
" Always True of me

I am not that concerned about what other people think of my work.	1 2 3 4
I prefer having someone set clear goals for me in my work.	1 2 3 4
The more difficult the problem, the more I enjoy trying to solve it.	1 2 3 4
I am keenly aware of the goals for setting good grades.	1 2 3 4
I want my work to provide me with opportunities for increasing my knowledge and skills.	1 2 3 4
To me, success means doing better than other people.	1 2 3 4
I prefer to figure things out for myself.	1 2 3 4
No matter what the outcome of a project(work) I am satisfied if I feel I gained a new experience.	1 2 3 4
I enjoy relatively simple, straight forward tasks.	1 2 3 4

10.	I am keenly aware of the grades (division) goals I have for myself.	1 2 3 4
11.	Curiosity is the driving force behind much of what I do.	1 2 3 4
12.	I am less concerned with what work I do than what I get for it.	1 2 3 4
13.	I enjoy tackling problems that are completely new to me.	1 2 3 4
14.	I prefer work I know I can do well over work that stretches my abilities	1 2 3 4
15.	I am concerned about how other people are going to react to my ideas	1 2 3 4
16.	I seldom think about grades(division) and awards.	1 2 3 4
17.	I am more comfortable when I can set my own goals.	1 2 3 4
18.	I believe that there is no point in doing a good job if no body else knows about it	1 2 3 4
19.	I am strongly motivated by the grades(division) I can earn.	1 2 3 4
20.	It is important for me to be able to do what I most enjoy.	1 2 3 4
21.	I prefer working on projects with clearly specified procedures.	1 2 3 4
22.	As long as I can do what I enjoy, I am not that concerned about exactly what grades(division) or awards I can earn.	1 2 3 4
23.	I enjoy doing work that is so absorbing that I forget about every thing else.	1 2 3 4
24	I am strongly motivated by the recognition I can earn from other people.	1 2 3 4
25.	I have to feel that I am earning something for what I do.	1 2 3 4
26.	I enjoy trying to solve complex problems.	1 2 3 4
27.	It is important for me to have an outlet for my self expression.	1 2 3 4
28.	I want to find out how good I really can be at my work.	1 2 3 4
29.	I want other people to find out how good I really can be at my work.	1 2 3 4
30.	What matters most to me is enjoying what I do.	1 2 3 4

(Thanks for your co-operation).

TEST RETEST RELIABILITIES IN RESPECT OF YOUR STYLE OF LEARNING AND THINKING, STUDENTS WORK PREFFERENCE AND MOTIVATION ORIENTATION INVENTORY AND MOUDSLEY PERSONALITY INVENTORY

				YSLT					ST W PRE MO INT					MPI		
	M/F	Stream	L1	L2	R1	R2	I1	I2	Ext.1	Ext.2	Int.1	Int.2	Neuro1	Neuro2	Extro1	Extro2
1	F	1	13	17	13	18	14	17	24	35	25	33	24	28	29	33
2	F	1	11	16	13	17	16	14	15	20	25	36	15	20	25	30
3	F	1	18	20	12	10	11	12	31	41	20	18	31	41	20	18
4	F	1	18	15	12	16	10	13	34	46	20	26	34	46	20	24
5	F	1	12	14	11	15	17	14	41	45	38	33	41	45	38	33
6	M	2	12	10	16	20	12	16	28	26	36	33	28	26	36	33
7	M	1	14	16	14	19	12	9	27	30	30	28	27	30	30	28
8	F	2	17	21	14	11	11	7	21	34	27	25	21	34	27	25
9	F	2	13	11	5	9	22	20	35	32	27	32	35	32	27	30
10	F	2	10	14	16	20	14	11	20	28	39	36	20	25	39	36
11	F	2	9	11	21	24	10	14	20	32	32	38	20	20	35	38
12	M	1	15	20	14	18	11	15	18	29	30	28	18	19	30	28
13	M	3	15	19	7	11	18	19	31	37	27	32	31	37	27	32
14	M	3	15	17	11	15	14	15	16	24	35	30	16	24	35	30
15	M	2	12	16	9	13	19	20	34	38	20	23	34	38	20	23
16	M	2	7	11	17	20	16	17	20	26	26	24	20	26	26	24
17	F	3	15	18	10	13	15	16	15	29	30	35	15	18	30	31
18	M	3	12	16	14	17	14	13	16	20	36	34	16	20	36	34
19	F	3	15	19	12	15	13	14	22	26	38	34	22	26	22	21
20	F	3	14	18	14	17	12	9	27	28	41	47	27	28	22	25
21	F	3	15	19	10	9	15	16	12	20	29	25	12	15	24	25
22	F	3	8	11	16	19	16	15	23	26	31	36	23	26	32	36
23	F	1	15	18	11	15	14	10	26	30	35	33	26	30	35	33
24	F	3	12	11	13	16	15	11	18	13	29	27	18	13	29	27
25	F	1	13	10	9	15	18	14	22	24	45	40	22	24	45	40
26	F	1	21	21	8	17	11	11	20	25	27	33	20	25	35	33
27	F	1	9	14	11	15	20	23	20	28	27	24	20	28	27	24
28	M	1	16	20	10	15	14	10	46	52	28	20	25	26	28	20
29	F	3	15	19	12	15	13	10	25	30	32	38	25	30	32	38
30	M	3	10	19	6	12	24	21	44	30	26	24	35	30	26	24
31	M	3	16	20	13	17	11	14	31	36	30	38	31	36	32	38

APPENDIX - B

				TEST RETEST RELIABILITIES IN RESPECT OF YOUR STYLE OF LEARNING AND THINKING, STUDENTS													
		WORK PREFFERENCE AND MOTIVATION ORIENTATION INVENTORY AND MOUDSLEY PERSONALITY INVENTORY															
				YSLT					ST W PRE MO INT					MPI		
	M/F	Stream	L1	L2	R1	R2	I1	I2	Ext.1	Ext.2	Int.1	Int.2	Neuro1	Neuro2	Extro1	Extro2
32	M	3	20	23	9	14	11	7	22	30	29	25	22	30	29	25
33	M	3	20	23	18	15	11	9	24	19	30	28	24	19	30	28
34	F	1	12	16	15	11	13	10	20	24	30	36	20	24	30	36
35	M	1	12	10	10	8	18	14	20	23	23	30	20	23	27	30
36	M	1	10	12	18	21	12	10	28	33	24	31	28	33	24	31
37	M	1	15	14	11	14	14	9	19	24	29	27	19	21	29	27
38	M	1	9	13	20	24	21	15	38	42	28	33	38	42	28	33
39	M	1	10	14	9	13	21	17	20	24	32	30	20	24	32	30
40	M	1	10	13	13	9	17	13	10	15	22	24	10	15	22	24
41	M	1	17	20	8	13	15	18	10	16	32	31	10	16	32	31
42	M	1	11	9	10	14	19	14	24	30	28	27	24	30	28	27
43	M	2	17	20	19	16	14	6	15	24	22	26	15	24	22	26
44	M	2	18	21	18	20	12	9	20	22	24	32	20	22	24	31
45	F	2	17	19	19	21	12	10	33	39	22	26	33	39	22	26
46	F	2	12	16	7	11	16	10	26	28	24	21	26	28	24	21
47	F	2	14	17	14	10	14	6	34	39	26	24	34	39	26	24
48	F	3	15	18	9	14	10	9	28	36	26	24	28	36	26	24
49	F	3	17	13	19	14	13	14	24	26	22	20	24	26	22	20
50	F	3	13	16	17	20	16	10	26	36	31	36	26	36	31	36
51	F	1	17	20	10	14	17	16	18	26	33	36	18	23	25	29
52	F	2	10	14	14	19	12	15	23	30	28	33	23	30	28	33
53	F	2	12	11	11	15	21	20	35	48	24	20	35	48	24	20
54	M	3	11	10	15	13	14	16	20	28	22	19	20	28	22	19
55	M	3	15	11	12	15	13	14	44	35	30	36	22	25	35	36
56	F	3	12	16	18	21	20	18	40	31	28	35	40	31	28	35
57	M	1	11	13	15	19	14	16	24	22	21	26	24	22	21	22
58	M	1	17	19	10	14	11	8	15	19	32	33	15	19	32	33
59	F	1	16	13	20	24	10	6	42	32	31	27	32	32	31	27
60	F	1	19	18	11	14	10	9	43	26	28	25	15	19	28	25

					TEST RETEST RELIABILITY IN RESPECT OF THINKING STYLE INVENTORY BY STERNBERG																						
SR.	D1	D11	D2	D22	D3	D33	D4	D44	D5	D55	D6	D66	D7	D77	D8	D88	D9	D99	D10	D10*	D11	D11*	D12	D12*	D13	D13*
1	40	22	41	40	31	34	25	28	34	31	35	33	43	31	26	18	24	25	29	27	26	15	19	18	19	25
2	48	25	40	39	37	29	37	35	47	42	28	27	44	38	42	30	37	25	36	35	51	38	39	36	34	23
3	50	38	45	26	37	33	27	25	43	40	33	30	31	22	34	22	33	28	44	41	21	22	49	47	29	16
4	49	46	47	44	35	35	31	30	39	42	29	28	33	25	26	19	40	30	41	40	39	30	49	46	36	27
5	35	34	44	22	38	31	40	40	40	38	42	40	44	36	50	38	40	30	47	46	51	41	46	44	44	32
6	51	50	44	42	42	35	38	36	44	42	32	30	38	34	33	25	43	39	43	40	44	36	54	50	37	19
7	50	47	50	46	46	44	20	22	51	48	48	46	48	40	40	30	24	25	32	31	53	40	51	49	40	29
8	52	50	44	41	38	35	27	25	42	39	33	31	32	24	31	20	25	27	30	29	50	42	38	36	23	19
9	49	46	47	46	31	29	17	19	43	41	37	35	38	31	30	17	25	19	31	30	56	42	36	34	39	25
10	41	25	45	24	35	31	36	31	36	38	28	26	40	41	19	20	30	18	44	41	31	32	41	40	38	29
11	39	25	47	45	40	35	37	33	54	50	35	34	46	42	41	33	36	25	41	40	44	40	31	30	32	26
12	44	40	49	41	44	40	32	30	48	45	46	44	48	39	29	17	45	35	48	45	25	45	43	40	45	32
13	49	45	49	44	52	50	32	31	45	45	29	30	47	37	36	35	40	31	49	46	45	36	49	46	39	28
14	44	47	34	28	41	39	29	27	44	42	49	45	46	45	37	36	42	33	30	29	35	31	46	45	25	19
15	41	30	42	39	42	40	23	20	47	44	47	42	48	38	41	30	40	32	27	25	49	36	43	40	28	19
16	41	28	30	22	23	21	22	21	29	28	32	31	15	21	30	30	23	12	18	20	36	30	29	27	27	22
17	46	44	41	37	27	26	33	30	43	40	35	33	26	34	29	31	42	20	47	42	51	45	45	46	28	20
18	53	51	51	49	49	44	22	20	53	50	36	32	30	22	32	20	36	32	34	33	54	45	51	48	23	19
19	48	49	40	38	45	44	40	38	44	45	45	41	41	34	45	38	41	39	35	30	42	33	42	40	36	22
20	40	33	38	36	29	46	31	28	43	40	25	26	21	15	29	22	39	39	36	35	51	48	39	38	33	23
21	41	40	40	39	33	30	36	32	33	31	20	17	43	35	33	26	35	36	35	34	46	45	37	36	41	30
22	44	42	41	38	38	34	35	31	43	39	36	31	40	33	37	33	44	31	36	33	54	52	54	52	44	20
23	45	43	40	35	36	35	20	19	44	41	24	21	39	31	36	26	35	36	24	26	51	48	45	42	25	20
24	44	40	43	39	36	32	26	24	42	40	23	20	38	32	35	26	37	33	32	30	46	42	45	35	30	21
25	47	44	26	22	33	31	31	30	42	40	26	15	28	22	28	19	41	38	34	35	39	37	47	40	18	19
26	47	45	45	42	39	36	39	35	48	45	23	33	27	20	37	25	34	32	48	42	35	36	52	40	27	18
27	43	40	39	36	41	39	32	30	42	40	35	24	30	21	35	35	43	41	42	40	42	40	49	36	14	20
28	45	41	44	41	34	36	26	22	46	41	26	37	26	20	39	31	32	30	34	32	49	45	44	40	16	19
29	50	48	52	51	38	35	27	25	54	51	36	41	24	19	34	26	49	45	33	30	47	45	54	42	29	16
30	51	50	48	46	44	41	23	21	55	52	46	35	50	40	46	35	37	35	51	48	46	42	52	40	22	17
31	45	46	48	45	47	46	33	30	51	40	43	35	41	32	42	32	35	31	34	31	52	51	50	39	35	20
32	45	24	44	43	38	35	27	25	47	42	40	30	44	34	36	28	28	26	40	38	53	45	50	38	30	19
33	43	40	26	22	34	34	48	45	24	22	34	24	41	21	32	27	34	31	42	41	36	31	36	29	32	21
34	38	36	45	40	34	36	24	21	47	49	36	25	46	35	32	23	32	30	34	33	38	30	44	31	46	28

TEST RETEST RELIABILITY IN RESPECT OF THINKING STYLE INVENTORY BY STERNBERG

SR.	D1	D11	D2	D22	D3	D33	D4	D44	D5	D55	D6	D66	D7	D77	D8	D88	D9	D99	D10	D10*	D11	D11*	D12	D12*	D13	D13*
35	51	50	47	48	39	36	22	23	48	35	36	34	42	30	31	22	35	32	39	30	51	40	43	32	39	30
36	36	32	52	50	39	37	30	29	46	42	27	45	30	20	22	15	33	30	27	35	46	41	37	36	38	21
37	47	42	47	46	36	36	44	30	47	45	33	31	38	32	33	21	31	30	37	34	47	34	49	26	34	20
38	46	41	54	50	35	32	39	23	40	39	39	37	40	30	31	19	29	29	27	25	53	40	53	41	31	25
39	43	40	43	42	37	35	43	40	45	41	24	22	29	21	31	22	44	40	36	34	37	35	40	39	34	22
40	50	48	51	50	34	32	40	21	51	40	35	31	33	24	28	18	38	35	43	40	42	40	48	46	41	31
41	42	22	45	44	38	36	48	30	42	36	28	25	32	25	29	17	27	24	35	33	34	26	29	27	42	26
42	51	49	30	28	36	31	36	34	38	36	32	31	40	31	31	21	39	35	33	33	46	38	41	39	39	30
43	48	46	54	50	46	42	42	40	49	41	24	26	37	30	30	19	31	30	47	44	24	25	37	25	23	16
44	43	40	38	20	26	38	36	35	50	39	42	40	38	38	52	38	46	42	47	40	44	30	52	26	22	15
45	46	45	52	50	53	49	43	41	48	42	41	38	48	41	36	22	33	31	45	42	37	31	44	30	42	30
46	53	49	41	30	28	26	39	26	28	19	42	39	18	20	41	32	30	29	43	40	26	16	28	16	46	28
47	40	38	45	41	36	35	31	30	39	28	30	29	26	20	29	22	25	22	39	37	34	22	43	32	34	22
48	44	41	43	40	36	34	38	36	40	30	35	33	31	24	28	19	40	38	36	35	33	26	36	25	43	25
49	48	20	35	36	32	30	37	35	39	34	33	30	15	18	26	15	43	40	37	32	32	22	43	31	15	22
50	36	31	51	48	37	32	37	16	36	25	30	28	39	31	42	30	31	30	19	20	36	29	43	21	36	24
51	49	45	39	37	42	38	34	32	41	29	26	22	37	30	38	30	34	31	43	40	38	31	49	30	13	17
52	36	32	49	45	43	39	35	31	51	38	36	31	48	32	39	29	39	36	46	40	46	38	50	27	36	24
53	38	21	49	46	38	36	36	33	45	30	34	30	39	31	43	31	42	40	23	41	37	31	42	21	37	22
54	49	45	39	35	43	40	35	32	41	29	26	25	37	24	38	25	34	30	43	20	38	30	49	35	32	16
55	48	46	47	42	44	40	35	31	50	36	36	32	28	16	26	23	37	35	43	41	45	38	46	34	32	20
56	39	18	44	40	36	38	27	25	48	34	35	34	22	18	26	22	28	26	41	40	34	20	29	17	26	11
57	52	48	45	41	34	30	37	33	49	35	30	27	18	19	23	20	38	32	39	39	46	34	48	25	33	20
58	47	45	49	26	36	32	39	34	45	36	34	30	36	20	28	26	39	36	37	29	46	31	41	26	30	17
59	45	26	43	40	39	31	36	32	46	35	28	28	35	25	31	26	47	43	30	27	50	48	50	30	35	21
60	47	41	36	34	39	33	29	27	40	30	36	35	48	22	46	25	34	30	31	28	40	32	39	21	46	22

D1= LEGISLATIVE STYLE
D2= EXECUTIVE STYLE
D3= JUDICIAL STYLE
D4= MONARCHIC STYLE
D5= HIERARCHIC STYLE
D6= OLIGARCHIC STYLE
D7=ANARCHIC STYLE
D8= GLOBAL STYLE
D9=LOCAL STYLE
D10= INTERNAL STYLE
D11= EXTERNAL STYLE
D12= LIBERAL STYLE
D13=CONSERVATIVE STYLE

	DATA IN RESPECT OF MALE SCIENCE																								
Sr.No	d. No.	M/F	tream	Resi	A1	A2	B1	B2	ACH.	C1	C2	C3	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13
1	101	1	10	111	39	48	20	24	56	14	10	16	44	43	43	37	51	29	27	31	25	31	43	42	32
2	102	1	10	111	45	41	27	29	63	16	14	10	54	49	50	30	50	30	38	43	38	30	35	46	32
3	103	1	10	112	38	39	14	25	55	18	6	26	35	35	31	25	34	35	43	26	24	29	26	19	23
4	104	1	10	111	44	35	31	36	49	15	16	9	47	49	45	31	51	28	43	35	41	47	45	48	34
5	105	1	10	112	40	47	19	26	53	17	10	13	47	40	41	35	47	38	44	34	36	39	43	47	40
6	106	1	10	111	36	56	15	32	59	17	13	20	43	46	41	34	38	29	39	35	32	23	43	31	33
7	107	1	10	111	41	40	34	27	58	16	14	10	47	39	37	33	41	30	40	31	42	46	28	45	30
8	108	1	10	112	39	49	18	25	55	10	15	15	32	36	39	22	47	38	32	35	30	26	45	39	32
9	109	1	10	112	34	41	28	24	52	14	10	16	54	45	50	26	47	32	46	40	32	29	20	48	49
10	110	1	10	112	28	35	10	38	48	16	16	8	51	41	27	35	36	31	37	39	47	25	51	47	24
11	111	1	10	111	48	45	23	30	62	11	11	18	45	37	38	39	40	33	43	31	41	42	44	47	26
12	112	1	10	112	41	44	18	22	59	13	18	9	42	31	52	31	50	39	29	47	43	31	49	47	20
13	113	1	10	112	45	42	12	19	60	20	13	7	33	47	40	30	44	33	32	30	51	43	47	56	36
14	114	1	10	112	50	48	8	13	62	13	10	17	33	25	31	23	48	17	27	11	48	9	53	41	41
15	115	1	10	112	36	48	15	14	50	17	17	6	43	40	36	35	51	34	31	38	34	27	42	36	37
16	116	1	10	111	40	44	42	8	55	20	11	9	43	34	43	39	54	15	27	36	41	41	46	49	14
17	117	1	10	112	45	52	28	25	57	12	17	11	35	36	37	24	43	35	36	21	46	46	40	45	42
18	118	1	10	112	49	44	32	30	59	13	15	12	34	39	39	38	39	34	41	32	43	45	43	45	25
19	119	1	10	112	41	44	21	27	56	17	14	9	46	38	50	28	37	35	39	42	38	36	48	42	39
20	120	1	10	111	43	46	30	32	58	10	14	16	46	39	34	37	48	27	27	33	26	41	49	41	34
21	121	1	10	111	46	41	28	30	57	17	6	17	39	51	42	37	46	36	34	33	41	43	35	38	36
22	122	1	10	112	31	57	4	30	59	11	12	17	38	52	36	26	48	30	38	41	35	33	35	33	25
23	123	1	10	111	37	50	10	28	58	16	13	11	36	51	40	23	51	19	39	42	32	27	37	50	39
24	124	1	10	111	43	47	10	26	56	20	10	10	48	50	44	25	54	36	40	34	43	44	45	48	38
25	125	1	10	111	35	44	19	28	54	16	12	12	44	48	37	29	51	33	38	37	35	37	45	50	22
26	126	1	10	111	35	40	32	40	53	10	15	15	34	36	27	30	38	32	34	36	32	29	36	28	30
27	127	1	10	111	43	48	16	30	58	19	7	24	49	48	38	38	54	27	35	49	45	46	48	48	43
28	128	1	10	112	33	40	7	29	53	12	11	17	35	48	41	32	43	37	40	28	44	29	48	47	35
29	129	1	10	112	45	44	26	34	57	17	13	20	43	50	26	27	40	22	34	28	26	51	40	45	14
30	130	1	10	112	37	40	1	22	55	13	9	18	49	40	29	38	37	26	25	27	33	45	30	27	27
31	131	1	10	112	46	51	44	29	53	16	19	15	36	42	43	27	51	26	38	37	41	42	55	56	31
32	132	1	10	111	43	48	34	25	56	14	16	10	40	49	42	25	53	30	33	37	41	32	40	46	35
33	133	1	10	112	41	50	18	32	58	10	16	14	48	40	39	39	46	30	43	38	36	46	48	49	41
34	134	1	10	111	39	45	18	18	53	13	17	10	40	37	39	25	39	21	40	37	30	36	42	39	32
35	135	1	10	111	43	43	26	28	57	13	16	11	37	35	37	42	38	39	35	43	38	43	43	29	43
36	136	1	10	111	43	44	27	30	58	16	13	11	37	39	41	47	44	36	44	34	47	43	46	40	43

Sr.No	d. No.	M/F	tream	Resi	A1	A2	B1	B2	ACH.	C1	C2	C3	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13
37	137	1	10	111	44	29	22	32	53	12	10	18	46	39	35	39	47	31	42	32	37	35	42	43	24
38	138	1	10	111	42	30	10	30	52	10	18	12	38	52	47	38	51	30	30	35	26	46	47	45	35
39	139	1	10	112	40	38	17	30	52	12	9	19	34	38	43	21	23	23	26	32	25	27	41	32	29
40	140	1	10	112	33	46	21	31	50	18	11	11	48	47	50	36	48	37	31	41	40	33	48	53	34
41	141	1	10	111	40	44	46	28	54	15	13	12	44	49	49	40	56	28	34	33	33	28	54	56	32
42	142	1	10	111	48	47	28	36	53	10	6	24	54	36	34	44	54	36	36	46	30	55	12	56	21
43	143	1	10	112	43	47	16	30	56	9	16	15	49	44	43	36	47	28	37	36	34	34	49	48	28
44	144	1	10	111	31	41	26	26	51	11	14	15	50	44	37	25	51	31	33	31	41	26	51	50	21
45	145	1	10	112	38	32	35	15	50	13	11	16	37	45	41	24	42	32	28	32	22	23	43	45	27
46	146	1	10	111	35	37	44	11	50	13	11	10	43	50	50	26	55	36	49	32	48	41	55	56	24
47	148	1	10	111	45	46	16	27	59	20	9	11	49	34	35	24	51	24	22	29	31	34	42	41	16
48	149	1	10	111	41	43	36	28	56	16	16	8	49	41	43	36	47	33	34	35	38	30	51	48	38
49	150	1	10	112	50	56	17	27	61	12	7	21	45	43	41	33	44	35	38	38	43	45	39	42	41
50	151	1	10	112	46	51	32	26	63	23	9	8	53	39	34	36	53	34	28	24	43	42	41	51	33
51	153	1	10	112	36	47	29	13	56	20	16	4	46	44	42	29	47	32	39	32	45	50	39	51	25
52	156	1	10	112	48	38	18	26	45	12	8	20	46	46	29	26	24	36	38	20	39	19	31	38	20
53	157	1	10	112	43	43	38	25	48	10	14	16	40	37	36	32	35	30	32	35	32	34	37	28	33
54	158	1	10	112	48	44	16	24	59	11	12	17	41	35	43	48	49	38	42	41	33	36	47	53	35
55	159	1	10	112	38	36	27	31	49	15	18	7	40	34	36	38	44	30	34	26	34	39	36	36	25
56	160	1	10	111	42	40	36	30	56	18	13	9	54	43	30	37	45	33	40	25	39	35	45	52	18
57	161	1	10	111	41	47	19	22	55	15	7	18	42	51	51	49	54	31	44	44	50	37	38	53	37
58	164	1	10	112	45	46	38	25	55	14	5	11	39	32	39	35	36	29	38	23	40	33	26	29	30
59	165	1	10	111	37	44	14	21	50	15	5	20	41	43	37	34	30	52	48	41	44	40	32	40	45
60	166	1	10	111	45	48	36	30	58	9	13	13	41	45	27	35	33	28	29	26	31	31	33	25	39
61	167	1	10	111	41	40	26	26	54	13	13	14	27	46	26	36	23	28	34	22	34	36	22	35	35
62	168	1	10	112	40	46	21	39	56	12	15	13	26	35	27	36	23	28	34	22	34	37	22	35	34
63	169	1	10	112	45	49	28	40	58	11	18	11	46	43	39	27	49	22	40	31	30	45	36	42	32
64	170	1	10	112	42	40	34	26	53	14	12	14	26	34	27	32	35	37	24	31	33	24	34	32	32
65	171	1	10	112	43	48	24	30	52	19	8	13	43	37	33	39	43	34	40	34	41	38	39	41	35
66	172	1	10	111	35	53	23	18	49	22	4	18	35	37	34	26	39	32	32	30	19	30	22	38	20
67	173	1	10	112	45	41	19	20	58	13	12	15	46	48	48	45	42	34	44	44	44	43	46	45	42
68	174	1	10	112	51	50	8	40	63	13	15	12	48	47	28	24	40	30	32	30	36	38	31	52	30
69	197	1	10	111	45	51	27	22	68	18	7	15	51	45	39	30	41	28	29	35	43	24	34	48	30
70	202	1	10	112	40	50	15	28	60	16	13	11	38	42	44	27	41	27	43	38	31	29	48	40	28
71	207	1	10	111	36	37	10	30	55	14	18	8	28	36	32	23	32	31	47	37	44	33	45	44	32
72	211	1	10	111	39	48	20	24	53	14	10	16	33	30	30	20	44	26	23	40	25	22	25	32	42
73	212	1	10	111	45	41	27	29	59	16	14	10	49	42	40	47	43	44	47	43	47	38	44	50	46

Sr.No	Id. No.	M/F	tream	Resi	A1	A2	B1	B2	ACH.	C1	C2	C3	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13
74	213	1	10	112	38	39	14	25	55	18	6	26	35	53	52	48	47	43	36	19	48	43	49	50	38
75	214	1	10	111	44	35	31	36	54	15	16	9	37	35	40	50	49	31	30	24	38	43	55	54	20
76	215	1	10	112	40	47	19	26	55	16	11	13	41	31	33	29	37	44	34	39	31	32	49	31	17
77	216	1	10	111	36	56	15	32	59	7	13	20	49	47	32	34	38	37	37	32	32	42	39	36	42
78	217	1	10	111	41	40	34	27	58	16	14	10	37	45	30	33	41	27	32	29	37	31	30	34	30
79	218	1	10	112	39	49	18	25	56	10	15	15	43	48	33	35	53	29	35	37	34	43	34	48	42
80	219	1	10	112	34	41	28	24	54	14	10	16	39	35	44	40	50	25	26	48	17	43	36	31	25
81	220	1	10	112	28	35	10	38	48	16	16	8	50	35	41	33	40	44	49	32	22	38	39	35	41
82	221	1	10	111	48	45	23	30	60	11	11	18	42	46	37	25	32	30	31	37	26	40	30	30	31
83	222	1	10	112	41	44	18	22	57	13	18	9	46	54	44	44	48	48	14	28	27	33	42	39	45
84	225	1	10	112	45	42	12	19	57	20	13	7	44	44	35	47	49	31	25	31	26	41	36	30	31
85	226	1	10	112	50	48	8	13	59	13	10	17	56	36	40	48	41	43	36	39	42	50	28	50	37
86	227	1	10	112	36	48	15	14	53	17	17	6	42	34	42	36	50	21	22	28	28	41	45	54	33
87	228	1	10	111	40	44	42	8	58	20	11	9	38	35	41	29	32	28	35	41	31	26	43	38	37
88	230	1	10	112	44	41	17	29	62	14	14	12	37	35	31	42	34	24	27	34	29	42	41	34	38
89	231	1	10	111	41	37	36	27	61	16	6	11	30	42	33	28	22	29	39	22	23	21	36	24	26
90	233	1	10	111	50	41	38	22	67	19	10	11	43	34	47	51	41	41	20	41	47	35	50	44	32
91	234	1	10	111	39	39	27	15	61	17	10	13	45	44	48	35	52	21	35	31	40	25	42	50	26
92	237	1	10	112	34	45	22	30	53	18	17	5	49	42	38	37	45	29	32	26	34	43	31	45	29
93	248	1	10	111	43	38	24	20	61	17	4	19	25	26	28	30	32	27	38	39	36	29	38	41	32
94	249	1	10	111	43	50	17	31	62	15	14	11	49	43	43	41	54	31	25	33	33	45	33	45	28
95	251	1	10	112	42	45	6	41	60	15	13	12	30	38	29	21	38	23	24	37	30	17	29	34	35
96	254	1	10	111	41	48	33	24	57	12	20	8	34	39	39	28	38	20	20	28	31	37	26	34	28
97	255	1	10	112	34	45	42	20	55	16	11	13	47	40	38	42	35	36	38	36	47	18	55	28	44
98	257	1	10	112	37	35	28	13	54	14	12	14	45	50	39	23	24	41	33	33	28	41	35	25	31
99	258	1	10	112	36	49	28	26	53	11	12	17	34	26	31	27	37	27	25	16	39	24	29	29	30
100	260	1	10	112	42	44	14	28	58	14	14	12	47	35	28	40	35	38	42	37	42	33	50	41	27
101	261	1	10	112	39	40	28	30	55	13	15	12	32	23	42	19	26	38	35	44	33	26	43	34	14
102	262	1	10	112	44	42	17	29	63	15	15	10	40	38	31	34	48	29	35	41	37	46	36	40	39
103	445	1	10	112	44	41	17	29	56	14	14	12	52	29	43	35	43	42	41	51	43	47	43	57	22
104	451	1	10	111	43	50	17	31	52	15	14	11	44	40	41	42	40	33	33	32	31	39	34	38	31
105	467	1	10	112	40	42	44	20	56	16	10	10	39	42	43	41	46	30	37	32	39	42	45	37	43
106	469	1	10	111	48	47	28	36	56	10	6	24	45	38	43	41	50	40	38	40	42	39	38	38	27
107	470	1	10	111	43	44	27	30	54	16	13	11	42	45	45	44	44	32	42	36	31	43	39	45	37
108	471	1	10	111	45	46	16	27	58	20	9	11	40	34	38	40	41	31	34	32	32	40	36	34	33

PECT OF FEMALE SCIENCE																									
Sr.No	d. No	M/F	tream	Resi	A1	A2	B1	B2	ACH.	C1	C2	C3	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13
1	162	2	10	111	47	45	14	30	57	15	16	9	34	41	31	25	34	35	43	26	24	29	26	19	23
2	163	2	10	111	46	52	25	19	56	17	11	22	38	40	37	37	47	28	44	42	37	36	51	39	34
3	223	2	10	111	47	45	14	30	58	15	16	9	46	37	37	27	43	33	31	34	33	44	21	49	29
4	224	2	10	111	46	52	25	19	56	17	11	22	49	47	35	31	39	29	33	26	40	41	39	49	36
5	253	2	10	111	38	40	29	23	52	13	8	19	35	32	38	40	40	42	44	50	40	47	51	46	44
6	334	2	10	111	38	42	18	22	58	15	11	14	51	44	42	38	44	32	38	33	43	43	44	54	27
7	339	2	10	112	34	39	24	26	52	13	9	18	50	50	46	20	51	48	48	40	24	32	53	51	40
8	340	2	10	112	38	39	2	18	57	21	8	11	52	44	38	27	42	33	32	31	25	30	50	38	23
9	341	2	10	112	41	43	27	24	58	9	11	20	49	47	31	17	43	37	38	30	25	31	56	36	39
10	342	2	10	112	42	44	44	20	59	16	10	14	32	35	35	36	36	28	40	19	30	44	31	41	38
11	351	2	10	112	47	45	14	30	58	15	16	9	33	47	40	37	54	35	46	41	36	41	44	31	32
12	352	2	10	112	46	50	25	19	56	18	12	20	44	49	44	32	48	46	48	29	45	48	25	43	45
13	353	2	10	112	45	42	26	34	57	10	12	18	49	49	52	32	45	29	47	36	40	49	45	49	39
14	354	2	10	112	40	47	25	32	60	10	16	14	44	34	41	29	44	49	46	37	42	30	35	46	25
15	355	2	10	112	36	44	10	32	57	19	21	10	38	42	42	23	47	47	48	41	40	27	49	43	28
16	356	2	10	112	38	40	29	23	55	13	8	19	31	32	23	22	29	32	19	30	23	18	36	29	27
17	357	2	10	112	34	45	42	20	57	16	11	13	46	41	27	33	43	35	32	29	42	47	51	45	28
18	358	2	10	112	37	35	28	13	56	14	12	14	53	51	49	22	53	36	30	32	36	34	54	51	23
19	359	2	10	111	38	40	29	23	52	13	8	19	48	40	45	40	44	45	41	45	41	35	42	42	36
20	360	2	10	111	41	48	33	24	57	12	20	8	37	38	29	31	43	25	21	29	39	36	51	39	33
21	361	2	10	111	43	38	24	20	61	17	4	19	41	40	33	36	33	20	43	33	35	35	46	37	41
22	362	2	10	111	43	50	17	31	62	15	14	11	44	41	38	35	43	36	40	37	44	36	54	54	44
23	363	2	10	111	35	42	20	32	63	11	8	21	45	40	36	20	44	24	39	36	35	24	51	45	25
24	364	2	10	111	42	48	18	30	61	13	10	17	44	43	36	26	42	23	38	35	37	32	46	45	30
25	365	2	10	111	40	42	16	30	60	13	8	19	47	32	33	31	42	26	28	28	41	34	39	47	18
26	366	2	10	111	37	50	10	28	58	16	13	11	47	45	39	39	48	23	27	37	34	48	35	52	27
27	367	2	10	111	41	46	12	26	56	19	11	10	43	39	41	32	42	35	27	35	43	42	42	49	19
28	368	2	10	111	35	44	19	28	54	16	12	12	45	44	34	26	46	26	26	39	32	34	49	44	16
29	369	2	10	111	35	40	32	40	53	10	16	14	50	52	38	27	54	36	24	34	49	33	47	54	29
30	370	2	10	111	43	48	16	30	57	19	7	24	51	48	44	23	55	46	50	46	37	51	46	52	22
31	371	2	10	111	41	46	33	26	57	15	17	8	45	48	47	33	51	43	41	42	35	34	52	50	35
32	372	2	10	112	31	57	6	30	56	11	12	17	35	44	38	27	47	40	44	36	28	40	53	50	30
33	373	2	10	112	45	48	28	26	57	12	17	11	43	34	34	48	24	34	21	32	34	42	36	36	32
34	374	2	10	112	41	43	18	22	59	13	18	9	38	45	34	24	47	36	46	32	32	34	38	44	46
35	375	2	10	112	39	48	18	26	55	10	14	16	51	47	39	22	48	36	42	31	35	39	51	43	39
36	376	2	10	112	45	43	27	33	55	17	13	20	36	52	39	30	46	27	30	22	33	27	46	37	38

DATA IN RESPECT OF FEMALE SCIENCE																									
Sr.No	d. No	M/F	tream	Resi	A1	A2	B1	B2	ACH.	C1	C2	C3	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13
37	377	2	10	112	42	48	16	30	58	10	12	18	47	47	36	34	47	33	38	33	31	37	47	49	24
38	378	2	10	112	41	44	21	27	56	17	14	9	46	54	35	29	40	39	40	31	29	27	53	53	31
39	379	2	10	112	35	44	20	30	72	18	12	10	43	43	37	43	45	24	29	31	44	36	37	40	34
40	380	2	10	112	36	43	22	30	71	20	12	8	50	51	34	30	51	35	33	28	38	43	42	48	41
41	381	2	10	112	39	46	24	34	69	11	13	16	33	45	38	28	42	28	32	29	27	35	34	29	32
42	382	2	10	112	39	45	34	35	63	13	13	10	51	39	36	36	38	32	40	31	39	33	46	41	39
43	392	2	10	112	36	44	20	28	59	12	11	17	48	54	46	42	49	24	37	30	31	47	24	37	23
44	393	2	10	112	45	41	30	28	66	15	5	20	43	28	40	36	50	42	38	52	46	47	44	52	22
45	394	2	10	112	38	46	28	30	59	10	12	18	46	52	53	43	48	41	48	36	33	45	37	44	42
46	395	2	10	112	40	41	20	32	63	13	7	20	53	36	28	31	28	42	18	41	30	43	26	28	46
47	396	2	10	112	34	46	20	32	57	11	10	19	40	45	36	31	39	30	26	29	25	39	34	43	34
48	397	2	10	112	39	45	18	28	58	12	9	19	44	43	36	38	40	35	31	28	40	36	33	36	43
49	398	2	10	112	42	48	18	30	65	13	10	17	27	35	32	37	39	33	15	26	43	37	32	43	21
50	399	2	10	112	48	48	16	30	64	13	7	20	36	51	37	27	36	30	39	42	31	19	36	43	36
51	400	2	10	112	45	46	25	34	68	15	14	11	49	39	42	34	41	26	37	38	34	43	38	49	16
52	402	2	10	112	35	43	20	30	56	11	8	21	36	49	43	35	51	36	48	39	39	46	46	50	36
53	411	2	10	112	40	46	21	39	58	12	15	13	26	49	38	36	45	34	39	43	42	23	37	42	37
54	412	2	10	112	45	48	28	40	61	11	18	11	49	39	43	35	41	26	37	38	34	43	38	49	16
55	413	2	10	112	43	40	34	27	55	14	13	9	48	47	44	35	50	36	28	26	37	43	45	46	32
56	414	2	10	112	35	53	23	18	53	19	8	13	29	44	36	27	48	35	22	26	28	41	34	29	26
57	415	2	10	112	45	41	19	20	60	13	12	15	52	45	34	37	49	30	18	23	38	39	46	48	33
58	416	2	10	112	51	50	8	40	63	13	15	12	47	39	36	39	45	34	36	28	39	37	46	41	30
59	417	2	10	112	41	53	6	32	62	15	11	14	37	43	39	36	46	28	35	31	47	30	50	50	35
60	418	2	10	112	39	37	29	26	56	11	9	20	47	36	39	29	40	36	42	26	34	31	40	39	26
61	419	2	10	112	45	37	34	26	57	11	16	13	42	42	39	34	36	37	30	25	25	31	30	25	30
62	420	2	10	112	43	34	46	28	56	19	11	10	51	52	39	23	51	33	34	32	34	37	43	46	20
63	421	2	10	112	40	41	26	25	54	18	16	16	51	52	39	23	51	33	34	32	34	39	43	46	20
64	422	2	10	112	44	49	22	24	56	15	7	18	42	46	37	35	47	31	32	40	30	34	45	40	32
65	423	2	10	112	47	40	15	33	59	16	11	13	38	49	37	18	48	30	31	32	23	36	36	42	28
66	424	2	10	112	43	42	22	35	57	11	20	19	29	24	39	29	29	26	33	31	27	22	44	32	32
67	425	2	10	112	40	42	33	27	55	15	11	14	44	43	43	28	50	29	37	29	40	26	45	39	37
68	426	2	10	112	44	40	16	30	56	19	20	21	39	43	42	30	40	26	35	29	30	22	49	41	31
69	427	2	10	112	37	38	34	18	54	10	9	15	34	31	30	31	38	34	35	20	17	45	22	43	19
70	428	2	10	112	37	31	11	26	52	10	13	17	41	44	39	37	50	33	45	36	44	26	43	39	36
71	429	2	10	111	41	37	36	27	63	16	6	12	36	45	46	40	51	33	33	41	21	34	42	52	27
72	430	2	10	111	40	44	12	29	60	15	9	6	41	34	36	26	28	25	24	23	24	25	27	39	26

DATA IN RESPECT OF FEMALE SCIENCE																										
Sr.No	d. No	M/F	tream	Resi	A1	A2	B1	B2	ACH.	C1	C2	C3	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13
73	431	2	10	111	50	41	38	22	66	19	10	11	47	42	49	34	45	41	36	46	47	37	44	45	37
74	432	2	10	111	39	39	27	15	63	17	10	13	35	40	38	33	42	31	43	32	29	23	34	33	20
75	433	2	10	111	38	52	38	28	60	17	14	9	45	42	42	17	32	33	25	21	26	39	45	50	39
76	434	2	10	111	33	39	24	32	58	13	5	22	36	51	49	43	52	35	41	50	20	13	40	50	25
77	439	2	10	112	41	42	34	35	63	13	13	14	45	44	36	30	45	27	46	29	39	24	42	45	39
78	440	2	10	112	40	43	24	34	64	11	13	16	42	53	45	50	48	41	36	45	47	40	41	40	37
79	441	2	10	112	38	44	22	30	66	20	12	8	35	57	44	49	47	39	40	40	41	39	44	45	23
80	442	2	10	112	36	42	20	30	65	18	12	10	48	48	32	23	49	31	38	33	31	39	55	50	31
81	443	2	10	111	36	44	20	28	62	12	11	17	42	53	35	48	47	41	37	40	39	40	39	52	33
82	462	2	10	111	39	41	18	22	55	15	11	14	47	44	35	41	39	31	42	33	35	32	40	37	31
83	464	2	10	111	39	43	24	26	56	13	9	18	44	44	37	33	44	32	47	27	36	41	41	44	27
84	465	2	10	111	36	40	2	18	55	21	8	11	49	44	39	36	48	21	35	24	32	41	41	40	28
85	466	2	10	112	41	44	27	24	57	19	11	20	35	43	28	39	41	28	33	29	36	41	41	44	28

	DATA IN RESPECT OF MALE ARTS																								
Sr.No	d. No.	M/F	tream	Resi	A1	A2	B1	B2	ACH.	C1	C2	C3	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13
1	147	1	11	111	40	38	7	31	58	20	18	11	34	39	39	28	38	20	20	28	31	37	26	34	28
2	152	1	11	112	42	39	24	22	57	16	15	9	50	42	45	25	52	32	47	36	44	38	39	54	38
3	154	1	11	112	45	44	28	32	50	17	13	10	40	32	48	35	50	25	26	38	24	20	50	55	23
4	155	1	11	112	38	38	36	30	49	12	16	12	40	43	46	14	47	30	36	26	32	35	38	56	36
5	175	1	11	112	41	53	6	32	61	15	5	20	41	34	40	41	48	35	35	38	31	39	35	43	28
6	176	1	11	112	39	37	28	23	49	11	19	20	32	41	33	33	34	30	42	32	37	41	37	34	39
7	177	1	11	112	45	37	34	26	55	11	16	13	35	44	37	31	40	20	23	34	43	25	48	34	43
8	178	1	11	112	43	34	46	28	53	9	11	10	42	41	37	44	34	28	45	41	39	37	33	34	39
9	179	1	11	111	40	41	26	25	50	8	16	16	35	39	38	30	38	20	20	28	31	31	26	34	28
10	180	1	11	112	44	49	22	24	54	15	17	18	40	42	44	14	45	30	33	26	32	34	37	53	36
11	181	1	11	112	47	40	15	32	57	16	11	13	45	34	39	38	43	26	32	35	31	29	28	46	26
12	182	1	11	112	43	42	22	32	53	11	20	19	49	46	43	36	48	31	37	32	36	25	44	48	39
13	183	1	11	112	40	42	33	27	50	15	11	14	47	38	39	50	43	37	33	42	39	43	45	47	40
14	184	1	11	112	44	40	16	30	54	9	20	21	41	48	36	38	46	30	38	36	30	38	45	42	35
15	185	1	11	111	37	37	34	18	49	10	19	11	45	48	45	38	50	29	37	37	35	41	48	47	31
16	186	1	11	111	37	31	11	26	49	10	13	17	42	44	28	38	34	29	40	32	25	42	39	40	29
17	187	1	11	111	44	45	20	30	54	17	18	15	37	44	47	32	43	32	32	37	36	35	54	45	25
18	188	1	11	111	44	44	16	36	54	11	10	19	33	47	39	26	43	31	27	32	31	28	41	32	25
19	189	1	11	111	39	49	21	38	49	17	17	16	38	38	22	41	28	29	33	23	24	34	35	32	29
20	190	1	11	111	43	31	40	23	53	12	14	14	40	47	39	43	50	32	47	27	36	41	41	44	28
21	191	1	11	111	36	40	16	22	46	12	10	18	39	41	34	24	43	20	27	32	31	40	40	47	34
22	195	1	11	112	35	39	16	37	45	12	19	19	38	37	28	32	36	27	27	35	35	37	29	35	29
23	196	1	11	112	30	41	39	22	50	9	17	14	27	27	37	17	35	17	21	28	29	28	47	26	20
24	204	1	11	112	35	40	25	30	54	12	18	10	47	49	39	36	20	17	37	32	21	24	25	15	29
25	293	1	11	112	47	51	20	28	57	9	18	23	44	45	22	33	46	31	22	30	49	29	45	37	12
26	294	1	11	112	36	40	16	22	46	12	10	18	33	35	46	33	28	39	32	33	36	38	24	29	39
27	295	1	11	112	43	31	40	23	51	12	14	14	47	40	40	38	46	46	48	29	34	45	50	48	33
28	296	1	11	112	39	49	21	38	48	17	17	16	33	41	34	44	50	18	21	37	29	31	53	29	32
29	297	1	11	112	38	39	16	36	52	11	10	19	36	41	29	37	44	26	33	30	36	25	26	37	23
30	299	1	11	112	37	31	11	26	46	10	13	17	38	36	28	32	36	27	27	34	34	35	29	35	29
31	301	1	11	112	46	40	16	30	53	9	20	21	27	27	38	18	36	18	21	28	29	28	47	26	20
32	302	1	11	112	40	38	33	27	50	15	11	14	33	35	45	32	28	36	32	33	37	38	24	29	39
33	305	1	11	112	44	49	22	24	56	15	17	18	50	44	50	32	56	26	44	44	32	56	32	56	14
34	306	1	11	111	40	41	26	25	53	8	16	16	29	30	41	35	39	33	38	36	25	24	32	30	27
35	307	1	11	111	43	34	46	28	50	9	11	10	21	23	28	39	34	37	32	36	40	37	38	38	31
36	310	1	11	112	41	53	6	32	46	15	15	20	36	36	28	37	24	33	31	29	35	34	26	38	34

	DATA IN RESPECT OF MALE ARTS																								
Sr.No	d. No.	M/F	tream	Resi	A1	A2	B1	B2	ACH.	C1	C2	C3	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13
37	311	1	11	112	41	42	21	30	52	11	15	14	40	35	44	39	44	19	20	35	26	35	29	48	28
38	312	1	11	112	40	37	33	26	54	15	12	13	37	45	44	46	42	42	49	38	44	42	37	46	52
39	313	1	11	111	41	43	25	30	53	17	10	13	42	40	33	29	35	42	23	41	37	43	17	29	35
40	314	1	11	111	45	47	21	29	56	12	10	18	34	29	35	36	38	41	49	30	19	32	45	46	13
41	315	1	11	111	40	42	23	27	57	12	11	17	33	40	24	44	27	45	27	25	39	37	37	30	30
42	318	1	11	111	45	46	25	34	58	15	14	11	45	43	37	28	50	32	30	24	27	31	43	41	27
43	452	1	11	112	44	49	22	24	56	15	17	18	45	34	39	38	43	26	31	34	30	29	28	44	26
44	453	1	11	112	40	44	33	27	53	15	11	11	49	46	43	36	45	30	35	31	36	25	40	42	39
45	457	1	11	112	40	30	24	26	57	12	14	14	48	47	32	23	49	30	38	33	32	39	55	50	31

	DATA IN RESPECT OF FEMALE ARTS																								
Sr.No	d. No	M/F	tream	Resi	A1	A2	B1	B2	ACH.	C1	C2	C3	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13
1	192	2	11	112	47	51	20	28	57	9	18	23	37	48	26	42	47	31	31	36	35	29	42	35	35
2	193	2	11	112	44	40	22	30	54	17	12	21	26	40	29	29	36	30	34	26	35	45	32	35	35
3	194	2	11	112	31	41	28	22	51	12	19	19	44	46	47	24	43	33	34	33	24	27	40	46	35
4	283	2	11	111	36	41	26	29	55	13	17	10	31	33	24	37	26	21	26	25	24	36	24	35	31
5	284	2	11	111	50	42	3	35	58	17	10	13	44	41	45	24	42	34	36	31	24	32	41	46	37
6	285	2	11	111	38	47	16	45	61	10	14	16	45	41	43	41	48	36	37	35	35	46	36	46	31
7	286	2	11	111	36	44	20	28	58	12	11	17	38	34	39	44	34	28	45	32	41	46	33	34	43
8	319	2	11	112	45	46	34	24	55	15	17	15	34	41	35	44	34	28	45	41	39	35	33	34	39
9	320	2	11	112	40	30	24	26	53	12	14	14	42	40	42	40	46	35	36	34	34	45	35	43	30
10	321	2	11	111	46	43	9	25	59	15	12	13	36	40	29	28	36	30	34	26	35	45	32	35	35
11	322	2	11	112	36	36	28	22	52	15	19	16	47	42	49	34	45	41	36	46	47	37	44	45	37
12	323	2	11	112	48	47	32	38	51	16	10	14	35	40	38	33	42	31	43	32	29	23	34	33	20
13	324	2	11	112	45	42	28	26	50	15	10	15	45	42	42	17	32	33	25	21	26	39	45	50	39
14	325	2	11	112	34	36	37	20	51	11	19	20	36	51	49	43	52	35	41	50	20	13	40	50	25
15	326	2	11	112	43	44	36	28	50	19	12	9	45	44	36	30	45	27	46	29	39	24	42	45	39
16	327	2	11	111	28	38	18	31	50	14	14	12	42	53	45	50	48	41	36	45	47	40	41	40	37
17	328	2	11	112	44	43	32	22	56	15	12	13	35	57	44	49	47	39	40	40	41	39	44	45	23
18	329	2	11	111	39	43	24	36	55	15	10	15	48	48	32	23	49	31	38	33	31	39	55	50	31
19	330	2	11	112	40	46	34	36	54	12	12	10	42	53	35	48	47	41	37	40	39	40	39	52	33
20	331	2	11	112	44	43	28	38	59	13	13	14	47	44	35	41	39	31	42	33	35	32	40	37	33
21	332	2	11	111	41	38	41	28	47	8	16	16	41	44	49	21	50	31	47	31	36	41	41	44	31
22	333	2	11	111	44	45	26	31	56	13	11	16	42	38	33	34	35	22	26	29	27	25	28	38	19
23	335	2	11	111	38	36	40	28	50	13	12	11	46	47	33	21	50	31	39	28	29	41	42	52	28
24	336	2	11	111	39	41	11	30	52	14	12	14	44	44	37	33	44	32	47	27	36	41	41	44	27
25	343	2	11	112	48	44	11	33	59	12	18	20	49	44	39	36	48	21	35	24	32	41	41	40	28
26	344	2	11	111	48	44	38	28	61	10	11	13	35	43	28	39	41	28	33	29	36	41	41	44	28
27	345	2	11	111	28	37	19	32	53	15	15	10	41	52	46	24	51	32	39	42	25	28	48	45	22
28	346	2	11	111	36	38	24	27	56	13	10	17	39	54	42	27	52	35	41	40	20	13	50	51	25
29	347	2	11	111	40	42	28	26	52	15	11	14	44	52	42	28	50	34	34	39	31	34	42	38	34
30	348	2	11	111	43	44	36	28	51	19	11	10	43	54	44	44	51	37	45	42	43	37	56	53	37
31	349	2	11	111	45	10	32	30	60	17	10	13	39	50	35	36	46	34	28	32	31	39	30	53	31
32	350	2	11	111	41	46	20	36	61	16	20	4	35	53	44	39	48	34	45	50	47	28	55	54	53
33	383	2	11	112	38	47	16	48	65	10	14	16	45	47	34	29	48	35	31	29	39	40	25	40	20
34	384	2	11	111	39	44	22	39	64	3	17	20	39	37	40	39	47	42	40	37	38	40	34	42	25
35	385	2	11	111	40	49	20	36	69	5	19	26	36	38	29	24	44	24	32	32	30	28	22	38	39
36	386	2	11	112	32	43	26	22	63	11	13	16	36	37	30	43	37	25	37	37	39	33	50	28	30

	DATA IN RESPECT OF FEMALE ARTS																								
Sr.No	d. No	M/F	tream	Resi	A1	A2	B1	B2	ACH.	C1	C2	C3	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13
37	387	2	11	112	32	44	10	42	67	17	14	9	42	47	39	30	50	38	29	39	38	37	51	51	44
38	388	2	11	111	43	37	12	12	68	13	15	12	51	31	44	30	40	37	28	40	43	37	56	55	37
39	389	2	11	112	49	54	5	31	68	10	10	20	45	32	35	29	48	31	40	34	25	40	40	45	25
40	390	2	11	112	43	42	17	37	63	16	18	6	51	34	46	33	52	36	28	20	26	35	49	49	19
41	391	2	11	112	33	42	6	32	58	18	17	15	33	37	37	45	33	22	42	21	39	32	30	28	33
42	401	2	11	112	50	42	0	36	71	17	10	13	45	47	34	29	42	35	31	30	38	40	25	40	20
43	403	2	11	112	47	54	18	38	63	16	22	2	33	38	37	45	33	23	42	21	39	32	30	28	33
44	404	2	11	112	37	47	20	36	57	10	12	18	45	56	44	34	51	20	30	24	26	33	50	42	46
45	405	2	11	112	36	48	21	35	55	11	10	19	38	35	33	25	46	34	36	37	34	34	34	31	42
46	406	2	11	112	48	42	10	32	62	17	11	12	36	28	31	26	27	26	27	32	27	34	27	36	27
47	407	2	11	112	34	45	20	32	60	11	11	18	30	50	45	33	52	25	38	35	33	22	51	48	37
48	408	2	11	112	39	45	27	31	58	10	11	19	33	34	33	28	39	33	41	28	37	27	32	35	41
49	409	2	11	112	43	40	17	36	61	16	19	5	46	47	37	28	49	37	35	34	43	44	42	49	36
50	410	2	11	112	32	40	12	32	58	18	18	14	36	31	42	42	23	36	33	26	29	39	48	33	22
51	435	2	11	112	40	44	27	33	61	15	11	14	35	39	35	32	33	41	38	19	34	44	37	36	36
52	436	2	11	112	49	45	28	34	62	12	17	21	33	32	37	38	27	27	33	33	34	29	31	18	41
53	437	2	11	112	40	36	31	30	59	18	10	9	37	29	43	20	38	26	24	37	31	29	41	31	30
54	438	2	11	112	32	38	26	31	58	17	11	12	45	45	32	22	48	31	39	38	29	41	42	52	28
55	456	2	11	112	45	42	28	26	50	15	10	15	43	37	33	42	32	45	27	36	40	39	43	27	30
56	458	2	11	111	46	43	9	25	50	15	12	13	49	44	39	36	47	22	36	26	32	43	41	44	28
57	459	2	11	111	28	38	18	31	50	14	14	12	41	51	43	24	50	32	39	42	25	28	47	43	22
58	460	2	11	111	39	43	24	36	56	15	10	15	40	50	42	27	52	35	40	41	20	14	50	50	26
59	461	2	11	111	41	38	41	28	46	8	16	16	44	52	42	28	50	34	34	39	31	34	42	38	34
60	463	2	11	112	38	40	11	30	54	12	13	15	47	41	47	33	40	41	36	45	46	37	48	45	37
61	468	2	11	112	38	41	11	33	52	15	12	13	38	40	38	35	42	31	33	33	29	23	34	35	20

DATA IN RESPECT OF MALE COMMERCE																									
Sr.No	d. No	M/F	tream	Resi	A1	A2	B1	B2	ACH.	C1	C2	C3	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13
1	199	1	12	112	46	43	9	26	59	15	9	16	25	42	36	36	27	32	34	23	26	31	31	32	33
2	200	1	12	112	46	52	12	23	61	9	8	23	45	32	33	29	42	37	42	35	37	50	25	45	32
3	201	1	12	111	40	49	12	12	60	16	14	10	40	26	30	27	35	32	30	25	26	29	34	33	37
4	205	1	12	112	39	40	30	38	56	15	13	12	52	48	41	34	48	17	35	30	37	51	22	42	28
5	206	1	12	112	36	48	16	21	54	13	7	20	45	27	42	35	44	23	43	49	23	24	48	43	19
6	208	1	12	112	46	48	13	23	58	11	13	16	44	48	44	48	46	47	51	51	48	49	42	51	33
7	209	1	12	112	38	41	22	32	57	7	5	28	43	42	38	33	35	42	31	30	35	20	51	30	32
8	229	1	12	112	38	39	28	29	54	12	16	12	33	40	31	38	38	29	39	32	30	30	40	39	41
9	232	1	12	111	40	44	12	29	60	15	9	6	47	50	38	39	43	35	29	40	33	39	25	52	24
10	235	1	12	111	38	52	38	28	57	17	14	9	26	38	35	29	40	41	37	34	34	33	39	42	40
11	236	1	12	112	33	39	24	32	55	13	5	12	33	32	31	36	34	29	38	41	28	34	44	31	17
12	238	1	12	112	32	41	24	32	58	17	19	4	38	40	42	47	44	39	36	39	36	50	42	46	32
13	239	1	12	112	35	38	18	22	52	18	18	4	42	44	22	45	41	29	26	35	34	46	36	38	39
14	240	1	12	111	40	45	28	31	59	15	11	14	46	42	40	27	37	26	34	29	42	43	29	47	25
15	247	1	12	112	49	43	40	26	65	9	6	15	49	47	38	36	47	35	36	40	34	42	48	44	28
16	250	1	12	112	41	50	32	18	62	17	13	10	29	39	33	48	38	29	27	29	41	37	40	41	27
17	252	1	12	112	36	39	32	30	53	12	14	14	38	43	38	41	34	29	29	29	28	27	28	34	33
18	256	1	12	112	36	38	24	31	53	14	8	18	49	46	48	42	54	41	45	41	38	52	39	54	42
19	259	1	12	111	29	46	17	27	49	10	16	14	30	49	37	28	34	35	43	31	34	30	32	29	37
20	263	1	12	111	41	43	12	28	60	16	8	6	51	28	53	44	56	53	50	49	44	54	38	50	14
21	264	1	12	111	40	51	38	28	66	17	14	9	31	40	34	36	40	27	28	36	34	42	38	39	32
22	265	1	12	112	32	41	24	32	61	16	19	5	34	50	52	35	50	29	40	22	27	32	56	46	34
23	266	1	12	112	35	38	18	22	56	18	18	4	42	47	37	31	52	38	50	42	38	43	51	53	42
24	267	1	12	112	40	46	10	22	55	10	16	14	45	48	42	53	55	34	33	38	45	45	54	49	38
25	268	1	12	112	36	43	3	32	54	9	20	11	27	35	45	32	25	36	34	32	38	28	26	47	35
26	269	1	12	112	30	44	45	32	57	12	8	16	44	45	39	29	48	21	36	23	33	45	36	48	30
27	270	1	12	111	40	44	28	31	53	15	11	14	40	45	41	47	46	36	42	33	38	39	47	50	39
28	287	1	12	112	30	41	39	22	48	9	17	14	48	45	37	41	51	31	52	32	47	50	37	53	34
29	288	1	12	112	39	41	38	12	49	15	15	10	53	41	36	29	51	38	38	34	36	44	37	51	35
30	289	1	12	112	29	33	34	24	46	7	17	16	53	42	45	43	49	29	54	32	48	49	33	53	36
31	290	1	12	112	35	39	16	37	52	12	9	19	42	30	32	39	46	34	37	38	42	31	35	35	37
32	291	1	12	112	31	41	28	22	50	12	9	19	54	30	40	37	52	33	32	26	38	33	52	34	15
33	292	1	12	112	44	40	22	30	54	17	12	21	47	40	38	29	45	30	36	38	27	31	30	41	37
34	298	1	12	112	44	45	20	30	56	17	8	15	48	49	43	31	38	44	33	30	23	23	30	25	23
35	300	1	12	112	37	37	34	18	48	10	9	14	35	33	24	38	34	35	29	35	33	36	42	37	28
36	303	1	12	112	43	42	22	32	52	11	20	19	32	28	36	32	43	29	36	32	36	29	32	24	27

DATA IN RESPECT OF MALE COMMERCE																									
Sr.No	d. No.	M/F	tream	Resi	A1	A2	B1	B2	ACH.	C1	C2	C3	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13
37	304	1	12	112	47	40	15	32	55	16	11	13	40	46	41	39	38	33	43	31	29	34	34	36	31
38	308	1	12	112	45	37	34	26	54	11	16	13	36	48	33	35	53	29	36	34	30	45	34	48	42
39	309	1	12	112	39	37	28	23	49	11	9	20	36	36	31	40	28	30	36	42	28	36	26	32	40
40	316	1	12	111	47	54	18	38	60	16	22	2	33	37	39	33	38	34	43	35	35	33	35	32	28
41	317	1	12	111	50	42	4	36	59	17	10	13	37	24	52	49	39	37	52	52	29	33	41	34	36
42	444	1	12	112	38	39	28	29	54	12	16	12	34	52	49	39	37	52	52	29	33	33	41	34	37
43	450	1	12	111	43	38	24	20	55	17	4	19	41	51	41	3	46	29	31	40	26	32	28	30	41
44	454	1	12	112	31	41	28	22	50	12	9	19	32	34	31	29	27	29	30	30	31	27	37	27	31
45	455	1	12	112	29	33	34	24	52	7	17	16	43	36	41	42	52	44	40	30	41	30	39	34	37